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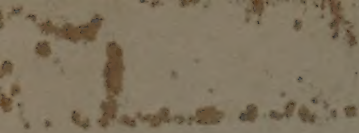


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PSYCHOLOGY
IN EDUCATION

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PSYCHOLOGY
IN EDUCATION //

BY

JAMES B. ^{part}STROUD

THE STATE UNIVERSITY OF IOWA

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PREFACE TO THE FIRST EDITION

This textbook is addressed to senior-college and graduate students and teachers. It provides a psychological treatment of practical problems in education and a systematic exposition of psychological data basic to education. Broadly speaking, it treats the educative process. Throughout, it is concerned with the practical. It also gives mature consideration, supplemented by experimental investigations and historical background, to various psychological phenomena that are basic to critical reflections about educational problems. So much has been said in education about laws of learning, transfer of training, motivation, schools or systems of psychology, and other topics of lesser scope, and especially since much that has been said is equivocal, it behooves us to gain some scholarly understanding of them. One can become an electrician without much knowledge of mathematics or electricity. To become an electrical engineer is another matter. Artful practice alone does not make a profession, be it in medicine, the law, or teaching. Also required is a substantial fund of organized knowledge basic thereto.

Source materials have been drawn rather liberally from investigations made in school situations, as well as those conducted in psychological laboratories. It is significant that experiments of the psychological laboratory and those conducted in class-room situations are mutually supporting. It has been the writer's experience that teachers and teachers in training have more confidence in the applicability of psychological findings to education when corroborative findings have been obtained under class-room conditions.

This book contains a considerable body of data drawn from sociology and cultural anthropology. To an extent it may be said

to be written from a sociological standpoint and to represent an approach to a social psychology of education. Such data enrich our knowledge of the social processes of education, motivation, the conditions of mental development, and of human behavior—habit, thought, and feeling—as determined by the cultural heritage. To this source we turn for information on the effect of class, race, and kindred factors upon education.

The volume provides a treatment of the *development of the human mind*; or, at least, an account of how experience—the cultural heritage, the educative process, etc.—contributes to this development. *Mental development* is, or should be, the central theme of educational psychology. An attempt has been made to show how, and the extent to which, mental development is fostered by education. Mental abilities do not, like Minerva, spring full-grown into being. They come about as a process of growth and development. Mental growth is not characterized by *stages*. All the mental processes appear to be present in young children. We do not have to await the attainment of a given developmental level before introducing reasoning, for example, in our schools. There is not one stage in which to specialize in the acquisition of factual information and another in which to cultivate critical thinking.

Considerable space is devoted to the psychology of basic school subjects. A chapter is assigned to reading; a substantial portion of a chapter to language and number. Discussions of such topics as the thought processes, critical thinking, cultivation of the higher mental processes, guided learning, retention of what is learned in school are especially appropriate to the social studies and science.

In the preparation of a textbook one is obligated to many persons. The writer wishes to acknowledge special indebtedness to Professor Ernest Horn, for many critical suggestions, and to Doctor Henry Smith and Miss Ava Van Duzer, for valuable assistance in the preparation of the manuscript.

JAMES B. STROUD

Iowa City
May, 1945

PREFACE TO THE REVISED EDITION

The level of the revised edition of *Psychology in Education* is about the same as that of the first edition. It is addressed to senior-college and graduate students. It is written in a freer style than the first edition and should be somewhat easier to read.

This edition contains four new chapters: Education and Social Class, Mental Hygiene and the School Child, The Profession of Teaching, and The Education of Exceptional Children. The subject matter of four chapters (IV, VII, VIII, and XVI) in the earlier edition has either been eliminated or incorporated in other chapters through reorganization. All of the chapters have been reorganized and most of the text has been rewritten.

Much of the new material added represents research or new points of view that have appeared since 1946. Some of it, on the other hand, represents rethinking and reinterpretation on the writer's part. For example, Chapter X, Approaches to the Psychology of Learning, gives a more comprehensive account of learning theory. The basic issues separating the schools of psychological thought have been sharpened. A more adequate treatment of S-R and field approaches has been attempted. Obviously this could have been done in the first edition. The same thing could be said of much of the material on mental hygiene.

At the end of many of the chapters are found ample references to new books and recent articles pertaining to the respective chapters. By consulting these sources the serious student can enhance enormously his grasp of the subject.

No apology is offered for retaining many of the older references in the text. The work of many of our leaders in the past generation is as fresh today as ever. Their work deserves continuing recognition. Moreover, the student needs acquaintance with such men.

Grateful acknowledgment is made to various colleagues who have freely offered advice and criticism at many points. Particular indebtedness is expressed to Professors Paul Blommers, I. E. Farber, William Eller, A. N. Hieronymus, and H. F. Spitzer.

JAMES B. STROUD

Iowa City
January, 1956

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PSYCHOLOGY
IN EDUCATION

I

THE EDUCATIVE PROCESS

THE WAYS OF MANKIND are learned. Human nature is learned. This is true in two very important respects. It is learned first by the races of mankind, and second, by the individual. Human nature is learned by the individual member of a race or a social group because the race or the social group before him had learned it.

Racial learning is slow and uncertain. The individual learns quickly and in predictable ways. Writing has been practiced for something like six thousand years. In a sense, it could be said that mankind was a half-million years in learning to write. The individual learns this art in pretty short order. A school child of ten has a fairly good knowledge of the function of the wheel. Mankind, again, was a half-million years in acquiring this knowledge. Racial learning can be interrupted or lost altogether. More than two thousand years ago, the Greek Eratosthenes knew that the world is round and computed its circumference within better than 95 per cent of the figure we accept today. Fifteen hundred years later men were proving once more that the earth is round.

For all practical purposes, animal nature is determined by biological inheritance. Man's animal nature is similarly derived. That which is human and not animal is derived from cultural inheritance. There are two very striking things about cultural inheritance. First, it differs from biological inheritance in that it is, or may be, independent of physical proximity or continuity. As

Simpson points out (see Chapter III) we can inherit from races that are not our physical kin or from ancestors long since dead, as did the men of the Renaissance. In the second place, cultural inheritance depends upon learning for its transmission. Learning does nothing to the genes. Each individual infant in our society today probably starts life with no more potentiality for civilized ways than did the infant born in paleolithic times. At least he need not do so. The difference is one of outlook. The infant of today has a very different cultural legacy. He must learn to inherit that, while he does not have to do anything to inherit his physical form and features.

Life is perpetuated by renewal. Dewey made this the distinction between animate and inanimate things.¹ Societies perpetuate or renew themselves by education. The species perpetuate or renew themselves by reproduction. People live by arts passed on by education from generation to generation. The mental development of a people is correlated with, and indeed conditioned by, their cultural development. Education is as necessary to one's becoming a savage as to his becoming a cultivated citizen of the most advanced society. As Dewey suggested, savage mentality is an effect rather than a cause of savage culture.

Some have suggested that this is much like the hen-and-egg problem. Indeed it is, which at the hen level is no problem at all. Which came first, the hen or the egg? Naturally, the egg, because there is no other way to produce a hen. There are other ways to produce eggs than by hens. There were eggs before there were hens. What laid the egg that yielded the first hen? Naturally, something that was not quite a hen. This may pose a problem somewhere far back into the sea, but it need not trouble us at either the hen level or the man level.

Which came first, man or culture? Man came first, because nothing else can hand down experiences to succeeding generations. But there were men, at least something almost men, before there was culture. Once a start was made, we may suppose the

¹ J. Dewey, *Democracy and Education* (New York: The Macmillan Company, 1916).

small beginnings were passed on to the next generation. For a few hundred thousand years progress was painfully slow. Twenty-five thousand years ago man was still immersed in the Stone Age. Ten thousand years ago he began to work metals. Six thousand years ago he began to write. Then it really happened! With writing, man had at his command the chief tool of civilization. Until the invention of writing there was no effective way of preserving and passing on achievements to succeeding generations.

The life of societies is not maintained merely by preserving the members in a physical sense, but also by initiating the immature members "into the interests, purposes, information, skill, and practices of the mature members."² Moreover, the mental characteristics of a people at any given time depend upon what is transmitted culturally, just as their morphological characteristics depend upon what is transmitted biologically.

There is another aspect to the development of the human mind, whether it be the mind of a people or that of an individual. A person does not see and hear and otherwise observe because he has sense organs and a brain. He does so in proportion as his sense organs and brain are trained. Thus we may infer that the meaning of the world and of all things therein has changed down through the ages as the mind of man has changed under the impact of his cultural heritage. People are educated by other people, by the ideas of other people. The same brilliant and beneficent sun shone down upon the peoples of the Nile for thousands of years before the sun-god worship took hold of Egyptian minds. It was not the sun, but the idea, that thus supplied the man of the Nile with the first form of religion known to the races of man.

Education in Primitive Societies

Those of our species whom we call primitive have a cultural history as long as our own, and in comparison with any other species are highly developed beings. The fabulous power wielded by present-day African chiefs "by virtue of their being mediators

² *Ibid.*, p. 3.

between the guilty living and the vengeful dead" is entirely unknown and entirely impossible except among creatures who are cultured.³ They are no less creatures of culture because of their primitiveness than are the rest of us. The history of their surviving culture is probably much longer than that of our own. In many primitive societies there are no schools and no teachers in the accepted usage of these terms. Much of the education of the youth is incidental. There is living together, and participation in activities. Some of these activities satisfy bodily needs and are their own warrant; others, such as those embodying ceremony, ritual, taboo, magic, and warfare, are reinforced by the highest social sanctions and are therefore accepted by the youth as being of the greatest worth. In these processes of social interaction the youth learn the activities of the group. Indeed these are some of the most effective conditions of learning and are rivaled in our own society only by the playground and some of the informal circumstances of home life. Always there is purpose in these activities—though the participants need not be conscious of the fact that they are learning.

There may, of course, be a good deal of purposeful tutoring by parents and elders in such primitive arts as shaping of sticks for digging roots and bulbs, in making fire, or in marriage rites or counter magic. But in all cases there is the condition not of participating for learning, but of participating in activities that are their own end. This kind of informal learning is not confined to preliterate peoples but takes place in every society. The Russian serf of bygone days, as he cowered before the arrogant nobility or sought to defend himself against physical violence, taught his children attitudes of servility more effectively than could have been done by the best formal instruction. In this same informal way, we may surmise, the Negro youth in many communities in America unhappily "learn their place."

The West African "bush" school. In the West African "bush" school we find at the preliterate level a highly formalized educa-

³ R. Wright, *Black Power* (New York: Harper and Brothers, 1953), pp. 283-84.

tional institution.⁴ The school is set apart, as any school for highly specialized instruction must be, although the educational activities are much more closely correlated with the purposes they serve than is the case in American schools. The values are more immediate and personal. The sense of personal responsibility of the learner is likely to be high, inasmuch as the end has social sanction and great prestige and the means is readily understood—that is, perceived to be appropriate to the end.

To begin with, the school amounts to a kind of secret society, separate societies being maintained for boys and girls. Training is a prerequisite to acceptance as a worthy and responsible member of society, as an initiate. The schools are held in special sections of forests set aside for the purpose. The length of the school varies from a few months to several years. Once a pupil has entered the premises he may not on any account leave until his schooling is completed. The principal figure in the boys' school is a leader of great mystic power and prestige. He commands high respect not only among his pupils but also among the chieftains and elders of the tribes. He is well versed in "native lore, arts and crafts," and "in the history and traditions of his people."⁵ He is assisted by a number of specialists in the various fields of instruction. On festive occasions the principal robes himself in costumes of great splendor. Upon his arrival in a village all the uninitiated must remain behind closed doors.

Upon entering the forest the boys, under the tutelage of their teachers, erect the village that is to house them during the school term. (This is burned at the close of the term.) They maintain the buildings, till the fields, and receive instruction in the various arts and crafts of tribal life, as well as training in the art of warfare and in various sports and other forms of recreation and in hunting. Instruction is also received in family and tribal life, including etiquette, tribal laws and traditions, the art of healing, and religion and ceremony. Thus while the "bush" school is set

⁴ M. H. Watkins, "The West African 'Bush' School," *American Journal of Sociology*, 48 (1943), 666-75.

⁵ *Ibid.*, p. 669.

apart from the normal life of the village and the chiefdom, this life is in large measure re-created, with the result that the values retain much of the personal aspect of informal education.

When the term of instruction comes to an end and the school and the accomplishments have been inspected by representatives of the chief, the boys return to the village amid great pomp and ceremony, lasting altogether several days. They are lavished with gifts and are permitted special privileges. Afterward they return to their homes with full privileges of citizenship, and even new names by which they are ever afterward known to the initiated—and all of this serves to bestow social sanction upon the schooling. Suffice it to say that similar schools are maintained for girls, with instruction appropriate to their walk of life. One cannot escape the reflection that from the point of view of their aims and purposes these schools must surely be remarkably efficient.

Midwestern highlands of Guatemala. These highlands of Guatemala, as described by Redfield, are communities which are intermediate, in many respects, between "the simple tribe and the modern city."⁶ These communities have formal education provided by schools, and the informal education of myth, legend, and ceremony; but neither type is of any great force. In reading Redfield's article one gathers the impression that here there is no great enthusiasm for reading, writing, and arithmetic—the principal content of the curriculum. Perhaps this is so because the schools play a minor role in perpetuating the culture of these societies. "Except for the texts of prayers recited on many occasions, little of the rural Ladino heritage depends on literacy." Few opportunities present themselves for the turning of literacy to any social account. In comparison with our own societies, literacy has little prestige. On the other hand, ceremony, ritual, and religious lore have no great hold on the people.

Insofar as the effective elements of instruction go, they seem to be derived from informal, incidental learning and teaching. This is as true in school as in the home and in the casual asso-

⁶ R. Redfield, "Culture and Education in the Midwestern Highlands of Guatemala," *American Journal of Sociology*, 48 (1943), 640-48.

ciations of people. There exist two cultures in these communities—the Indian and the Ladino. The Ladinos are a minority group of Spanish-speaking people of mixed racial stock. Although largely Indian in race, they have maintained certain elements of Spanish culture. In the schools the Indians learn to speak the Spanish language, though it is not one of the subjects of the curriculum, and tend to adopt Ladino dress and customs. The Ladinos also are influenced by Indian culture. Here we find the school fostering the amalgamation of two cultures, but doing so quite over and above formal instruction or any other function of the school as formally rationalized. Here the school as a social group is of considerably greater importance than the school as a formally organized institution for the teaching of reading, writing, and arithmetic.

While in American schools the curricular content is of much greater importance than it is in the midwestern highlands of Guatemala, we may find, as an extremely important function of the school, similar processes of acculturation, notably between the immigrant and the native-born youth. This is especially true where dissimilarities in cultural level, or racial, religious, and national prejudices, are not so great as to constitute a barrier to group interaction (see Chapter IV).

Spontaneous Learning

Beings who are born not only unaware of, but quite indifferent to, the aims and habits of their social group have to be rendered cognizant of them and actively interested.—Dewey, *op. cit.*, p. 3.

One of the salient aspects of the kind of learning we have been considering up to now is its spontaneity. Examples of the things the youth are expected to learn are everywhere present, examples that are reinforced by social sanctions. Here, as Mead has said, learning, not teaching, is in the foreground. The learner is in a position of seeking to learn something rather than being faced with a situation in which a teacher wishes to teach something—

something that the learner does not of his own accord seek out—as is so often the case in American schools. “There are several striking differences between our concept of education today and that of any contemporary primitive society; but perhaps the most important one is the shift from the need for an individual to learn something that everyone agrees he would wish to know to the will of some individual to teach something which it is not agreed that anyone has any desire to know.”⁷ While this statement is not entirely true—tens of thousands of American children are probably as desirous of learning to read as the Eskimo children are of learning to spear fish or chew boots—the point is well taken, and stands as one of the fundamental differences between formal learning and informal learning.

In civilized societies there are also almost innumerable instances of spontaneous learning in the home, on the playground, and even in school. Indeed, such learning is a prerequisite to the formal learning we think it the business of the schools to provide. In a sense, our schools may be said to begin where primitive education stops. There are in general some differences between the informal learning of children in preliterate societies and that of children in civilized societies. Ordinarily the opportunities in the latter are more diversified. Tribal life, consisting as it does of rigid customs and almost unending ceremonial usages, is quite stereotyped. Even if we abandoned our schools, our education might be less efficient, because our customs are not reinforced to so great a degree by the coercive power of ritual and ceremony. Of course, they probably would become so as we gradually returned to tribal conditions.

Obviously, primitive educational practices, despite the favorable element of spontaneity, do not produce civilized people. It is by teaching children things that they do not, or did not, spontaneously wish to know as a natural consequence of their social life, that we have raised the whole cultural and intellectual level of mankind.

⁷ M. Mead, “Our Educational Emphases in Primitive Perspective,” *American Journal of Sociology*, 48 (1943), 633-39.

Life in civilized societies is not as homogeneous and as closely knit as life in primitive societies. There is an enormous amount of diversity, and social stratification, with attendant differences in customs, social and religious participation, ways of earning a living, and in all kinds of allegiances. Large segments of the people may have no effective contacts with other large segments, such as to bring about reciprocal social influences. About the only choice we have lies between setting up separate systems of instruction for different social strata and continuing to provide instruction in which many of our youth have no spontaneous interest.

Education in the United States

There is a question as to the extent to which our educational aims, nationally speaking, are compatible with a procedure based upon spontaneous interests. In preliterate society education serves to perpetuate the society and to preserve it against change. One of the functions served by ceremony and ritual is to keep out interlopers, just as the formal rules of etiquette and correct speech and dress preserve polite society from inroads by the uninitiated. Our educational aims are not merely to preserve and perpetuate the social heritage, but also to advance, to raise the whole cultural level of society by extending our cultural products to all the youth—many of whom are admittedly not ready for them in the sense that they go out seeking them. It is clear that this procedure creates dislocations and must operate under great difficulty. The task of transmitting culture to groups that have little or no spontaneous interest in it is a difficult one.

Our choice is one between awaiting the slow processes of acculturation and providing schools to teach only that which is sought by the pupil, or proselytizing, that is, *providing persons with a zeal to teach that which the great majority have no spontaneous desire to learn*. Of course we try to create the desire to learn, but this is proselytizing. To do a very inefficient job of schooling

people who by reason of the culture lag are lacking in interest in it may be better than passing them by.

What does it mean to have a spontaneous interest in learning—to have a condition in which the learner seeks to know as opposed to one in which someone seeks to teach something the learner does not wish to know except as he is motivated by extraneous devices? Let us first see what it is not. It is not a natural interest, like appetite, which people everywhere have because they are people. It does not pertain to any fixed content that is alike for all people. Spontaneous interest in learning comes about as a resultant of a particular set of cultural forces operating in a particular social situation. In one such situation the desire to learn to read the vernacular may be quite spontaneous, and in another entirely lacking. Interests are not spontaneous because they are primitive, although in primitive society education is largely limited to spontaneous interests. The latter circumstance certainly makes for an easy-running *process*, while the *results* achieved by our system are incomparably superior—at least from our standpoint.

Our youth not only become indoctrinated with a contemporary culture vastly more complex than that of the Bushman or native Australian, but they gain a fair knowledge of the culture of all ages. Redfield has noted that “In comparison with the educational effect of a *katchina* dance upon a Hopi child, a chapter in a civics textbook seems pretty thin, educationally speaking.”⁸ Of this there is no doubt. But civics and other subjects of its kind poorly learned are of vastly more worth, educationally, than the *katchina* dance and all its kind well learned in Hopi culture.

Indoctrination. The dominant note in education in America, insofar as it has become articulate, has been the use of schools as instruments for producing change rather than for maintaining the status quo. This would seem to be inevitable in a society that is making rapid growth (or change). In the United States, in particular, schooling has been looked upon as an opportunity for moving from one social stratum to another. As is seen from the foregoing discussion, when put to such use, education encounters

⁸ *Op. cit.*, p. 640.

certain obstacles. In our own country we have had to contend with social stratification—which, by the way, has not been so severe as in many other countries—and with large immigrant and Negro populations.

To the extent that the desire for change has been present with the people so affected, and to the extent that schooling has been seen clearly by them as a plausible means to this end (perhaps at best this is usually seen only in the most general way), conditions have been favorable to the dissemination of knowledge by the schools. To this extent, at least some of the conditions of seeking to learn have been operative; and the recipients have not been indoctrinated against their will.

On the other hand, there are very large numbers in the school population who are expected to learn things they see little use in and the need for which does not grow out of their own social situation. These elements, as seen in Chapter XI, do not take well to schooling. Moreover, by virtue of various kinds of exclusion or social isolation (see Chapter IV), and consequent interruption of communication, the informal educative processes as mediated by social interaction do not function well.

Public elementary schools were made free (tuition-free) in 1881 in France; in 1888 in Prussia (they had been free to the poor since the time of Frederick the Great). In England the elementary schools were made free to the poor in 1870, were pretty largely made free to all in 1891, and entirely free in 1918. For the most part they have been free in the United States since Revolutionary days. Compulsory school-attendance laws were enacted in Massachusetts in 1852; and all the other 47 states had enacted similar laws by 1918. Such laws are in existence in various other countries.

Here we have clear cases of certain social strata dictating the education of other strata. For millions of children this has meant schooling they did not want. Today, going to school has such a degree of social sanction that these compulsory-attendance laws are of comparatively little social consequence, except for truants; yet many of the old elements still prevail, in that the cultural

background of a large percentage of the children neither produces a spontaneous desire to learn much of the content of the curriculum nor supplies them with the preliminary education with which to do so. We have not been content to teach children to think, feel, and act as their fathers did. We have aimed, at least for most children, to improve upon paternal attainment. This has led to progress; but it has also aggravated our difficulties. Instances in exaggerated and unmistakable form are seen where missionaries have gone, and in nearly all the plundering of indigenous populations by the white man. Another example is our government's earlier practice of segregating Indian children in boarding schools. We may surmise that there was little in native Indian life to serve as a background for the instruction imposed upon the Indian youth, and still less to lead to a spontaneous drive toward this instruction. In fact, their early and very potent formative training may have operated in some respects as a distinct disadvantage. It is not surprising that they made slow progress in the mastery of instruction, or that upon reaffiliation with tribal life they "returned to the blankets." The white man's culture was of little use in Indian culture, and had the Indian persisted in it, the result would have been social ostracism.⁹

In the imposition of Western culture upon Africa the dislocations have been exaggerated by teachers who have, in most instances, been missionaries. This has meant zeal for propagating a new religion and with it a new family and social life and moral values, as well as new schools. Also commercial interests added a new economic system.¹⁰

Man lives in his culture, for his culture, and by his culture. To transform this traditional heritage, to make a branch of humanity jump across centuries of development, is a process in which only a highly skilled and scientifically founded achievement of cultural engineering can reach positive results.¹¹

⁹ S. Mekeel, "An Anthropologist's Observations on Indian Education," *Progressive Education*, 13 (1936), 151-59.

¹⁰ B. Malinowski, "The Pan-African Problem of Culture Contact," *American Journal of Sociology*, 48 (1943), 649-65.

¹¹ *Ibid.*, p. 650.

When, as in Africa, barriers are raised which exclude a minority group from the most important rights and privileges of the majority group, conditions become particularly violent. The American Indian probably had little enough interest in European culture; but the color line has been only loosely drawn, as seen, for one thing, by the fact that Indians with white blood tend to be accepted by the white caste, much as is the case with Negroes in Brazil. Whereas in Africa, as in America, a white person with any known amount of Negro blood, even when it is not obvious, is classed as a Negro, and therefore often subject to social exclusion.

Education does not grow in barren soil. Transculturation does not take place because of physical proximity, but because of free social interaction. And the more formal education of the school does not always have the beneficent influence claimed for it. Schooling alone, even were it well done—and it is never well done when it is too much out of step with the other aspects of culture—cannot elevate a people to any great degree. Seeing that highly civilized people are well schooled, we are wont to look upon schooling as a sufficient means of raising subjugated preliterate peoples to the plane of living of the dominant group. Schooling is certainly one of the means, and a necessary one; but not a sufficient one. Birthright and opportunity are requisite also. In a superficial sense schooling does seem to work wonders among our immigrant populations. But upon closer examination we see that the wonder is worked not only in proportion to the amount of schooling obtained but also in proportion to the extent to which they are accepted by the majority group: and for the immigrant, schooling is a means to fuller acceptance.

On the other hand, the American Negro youth has not been accepted, for the most part, even when he attained a level of culture achieved by white youth. In addition to his being thus denied one of the most potent educational factors—free social interaction, he does not have the same birthright and opportunity. Except from the enhancement of his prestige in his own group, he is not better off for having received schooling to anything like the de-

gree that the immigrant youth is, to say nothing of the nonimmigrant white youth.

Indoctrination and freedom. As we compare our system of schooling and its comparative lack of freedom and spontaneity in learning with the informal educational methods found in schoolless societies, we are likely to be deceived regarding the relative degrees of freedom of thought and action produced by the two systems. It is true that the method of education in these schoolless societies is quite informal, and there is little coercion except that which stems from the normal processes of social interaction. But on the side of educational content we do not find these same conditions. The forces that shape the child's mind are rather narrowly laid down and indeed quite rigid. It would be difficult to find a more completely fettered human mind, one with less freedom of thought and action, and one less originaive, than that of the savage.

Insofar as content is concerned, much of the ritual of preliterates is quite senseless and in this respect compares with the rote learning of the schoolmasters of old. However, it differs in one tremendously important respect—in that when learned, it serves a social purpose much more real and vital than did the phrases learned by rote from a book; and its learning is more spontaneous in that its need grows out of what to the learner must appear to be a perfectly natural social demand.

Freedom of thought and action is not conditioned solely or even primarily by the character of the motives and the incentives to learning. It is the content that counts for most. A prescribed curriculum and a zeal to teach that which the learner does not spontaneously wish to learn do not in themselves fetter the mind. They may be the very means of freeing it. We do not ensure freedom merely by allowing a pupil to follow his own interests. By urging him to learn things he does not wish to learn we may, to be sure, fetter his mind; or we may lead him to knowledge that he never dreamed existed and free his mind from the bondage imposed by the narrow limitations of his early training. Again, it is the func-

tional nature of the training, not the nature of the motives and the incentives, that determines whether he shall be free or not.

Contradictions of Practice and Theory

Obviously, the remedy for our educational ills does not lie in the direction of primitive kinds of education, nor in emulating primitive methods of teaching and learning. But in seeing what it is in their methods that makes them so effective within the primitive sphere of life, we should insofar as is possible utilize the same conditions in our methods and with respect to our content. At the same time, it should be appreciated that some of their conditions are incompatible with our educational aims. It is doubtful if any of them can be transferred directly to our formal schooling. Perhaps the Parker-Dewey activity-child-centered school (features of which, among others, are perpetuated by so-called progressive education) provides the best framework of any yet tried for the utilization of the effective elements in the smooth-working education of the preliterates (see Chapter XII). The unit plan of instruction, when considerable care is given to the assignment for purposes of delineating the problem and making clear the nature of the tasks to be executed and in vitalizing them, is also a step in this direction—especially the co-operative assignment, as is also the socialized recitation. It is important to create and keep alive in our classrooms the social spirit of working together at tasks that are made to have social value to the pupils.

It is not because activities are steeped in tradition and ceremony, or coupled with social sanctions and the necessities of life, that they are so learnable. It is rather that these conditions foster an eager and spontaneous desire to perform them, and when performed, they lead to satisfying results. The reasons for performing the activities are contained in the activities, not extraneous to them. Our need is to provide conditions that lead to interests—spontaneous where possible, but at least interests—in performing activities that lead to the learning of things our youth should learn.

Clearly, the realization of this is difficult to achieve because our educational needs are so great and many of them so remote to the young learner at any point in his educational career. Owing to the nature and the complexity of our economic life, a youth usually sees but little of the activity of adults for which he himself may be preparing. Most of the adult occupations are outside the home and frequently do not come within the youth's observations. Much of the young learner's education has as its purpose the mastery, and preparation for mastery, of the tools of civilization—the meanings of which are ordinarily inadequately comprehended by him. The social life of the great majority of young children in our society does not serve to create a spontaneous interest in much of the subject matter of our schools; and in many cases does not even serve as an adequate introduction to it. We cannot wait for the pupil to develop a spontaneous interest in things the very existence of which has never occurred to him and his need of which in adult life is equally remote. Frequently we are in a position of having to teach a pupil a good deal about an activity before he is in a position to have an intelligent interest in it. Thus a good assignment, often, is one that supplies enough preliminary knowledge to provide a basis for further interest.

Notwithstanding these difficulties, it is of the greatest importance that interests in the activities of the school, interests strong enough to sustain the activities, be developed. There should be a need—as has been said, a strongly felt need—on the part of the pupil, although this need as experienced by the pupil may not be the same as his ultimate educational needs broadly considered. It is unlikely that the child has much conception of his ultimate educational needs or that he would be much moved by them if he did have it. The needs must be appropriate to his life here and now as he finds himself in a social situation.¹² This problem is the subject of further discussion in later chapters. The doctrine is not new—it is at least a half-century old—and the fact that so many of our schools are far from having realized its objectives, despite its

¹² Cf. E. R. Embree, "The Educational Process as Applied in America," *American Journal of Sociology*, 48 (1943), 759-64.

wide acceptance in theory, should tell us that it is not easy to implement.

Some Difficulties in American Education

For all practical purposes elementary education has been tuition-free from Revolutionary days. Now many states provide free textbooks. Noon lunches are frequently supplied at nominal cost. Moreover, the elementary school is, and has been, a common school. There is not one curriculum for one social class or one purpose and another curriculum for another social class or purpose. The American secondary school has generally been a free school for about the last half of our national existence. It is also to a large extent a common school. While our larger systems provide more than a single curriculum, there has existed a large measure of freedom in selection upon the part of the pupils.

Obviously, the elementary school in America is scarcely selective at all, and the secondary school is far from being highly selective; it is scarcely selective at all by design. The percentage of American youth going to college in America is several times that found in Great Britain, for example. Our colleges are less selective than those of Great Britain—or those of most other countries, for that matter.

How has all this worked? Perhaps there is one point upon which all could agree—namely, that it has enabled countless thousands of young men and women of ability to secure a good education and to improve their positions in life, neither of which could have been realized otherwise. Thus our schools have been a tremendous force in upward class mobility. In a democratic country this seems quite important. It must also be admitted that our system of secondary education, and to some extent our system of collegiate education, permits countless thousands of youth to go to school who do not secure a good education, at least not a good academic education. While this may do the reputation of the schools no good, it is quite probable that it has done such pupils some good, and our nation some good. We should, of course, have

to defend the proposition that the masses in America are better educated than the masses elsewhere, and that our intellectual elite are about as well educated as those of other countries.

It is overwhelmingly true that vast numbers of pupils pass through our schools without ever manifesting any serious academic interests. No one acquainted with the facts would argue that the typical high-school graduate in America could compare at all favorably with his counterpart in Europe, for example. We could, of course, raise our standards. But this is not the whole of the matter. Students are bound to be affected by the general optimism that prevails in our country. The United States is not and has never been a land of boundless opportunity, but it is a land of relatively great opportunity. Perhaps most youth confidently expect to get ahead, to find adequate employment, if not at first, then later. They may not think it overly important to study, but they are likely to regard it quite important to go to school. The high-school student may regard friendship with the right students, membership in cliques and social organizations, and participation in school activities as being quite as important as scholarship. It is likely that most high-school seniors would rather be president of their class than to be first-honor student in the class. It is equally likely that the American college woman would rather be elected to Mortar Board than to Phi Beta Kappa. Where would the student get such notions except from American society, of which the schools are a part?

A more comprehensive question is: How well has the American system of education served the cause of our democratic ideals? Some of our difficulties derive from our educational ideals. We dare not provide different systems of secondary education and different curricula and enroll students in them upon the basis of social class. While this is true, it is also true that ours is a class-structured society.

Our schools are an integral part of this society. As in other matters in American life, the various social classes do not participate equally—and not at all equally in proportion to numbers—in shaping the policies of our schools. Control tends to be vested in the

upper social strata. The citizens in the upper strata own and control a disproportionate share of the country's wealth and are quite alert to their vested interests. Not only are upper-class citizens aware of their vested interests, but they have the power, the connections, and the organization to protect their interests. None of these things can be said with much assurance about lower-class citizens, although the latter are far more numerous.

One critic of the American scene questions whether the American system of public education has ever faced up to its responsibilities for leadership in the development of our democracy.¹³ Professor Counts has also raised a question as to whether or not our schools dare do this.¹⁴

Obviously our schools could not openly teach Communism. They are not free to do so. They probably are not free to teach, approvingly, socialized medicine, public ownership of utilities, legislation to discourage absentee ownership of farm land; to teach the facts about how some of our great industrial empires were built, for example oil empires, or lumber empires in the Northwest, about the concentration of wealth in the hands of churches; to inquire into some of the motives of the states rights advocates in Oregon and other Western states, to take only a few examples. It is overwhelmingly true that our schools are not free to interpret the American democracy in just any way they see fit. But it is equally true—and this should not be passed over lightly—that our schools have been relatively free from constraining or compulsive influences from government and from vested interests of powerful and organized groups. While we may not be free to teach with approval public ownership of public utilities, or even in some states the facts about oleomargarine, we are free *not to teach* the virtues of private ownership of public utilities, or of butter, if such a course suits us. If, for example, we do not like "partnership" as a political philosophy, we are not free to say so

¹³ H. J. Laski, *The American Democracy* (New York: Viking Press, 1948), Chap. 8.

¹⁴ G. S. Counts, *Dare the School Build a New Social Order?* (New York: John Day Company, 1932).

in our classes, but we are free *not* to say that we do like it. In Nazi Germany, in Imperial Japan, and in Russia we have seen how schools can be made to serve the cause of particular ideologies or national objectives, and how effectively this can be done. Compared with these schools, our own public schools enjoy a high degree of freedom. It is to our credit that the public schools have been relatively free of *pressures* from government, the National Association of Manufacturers, the American Federation of Labor, the American Council of Churches, the American Legion, and the like. There are special-interest groups at every turn to restrain us, and obviously sometimes to the detriment of our national welfare. Even so, the area of freedom is fairly large, and it is very significant.

It is of great importance that our schools have been under no great pressure to promote special interests. Many kinds of instructional materials, such as educational films, are provided to schools free of charge by manufacturing and commercial interests, most of which materials have some "advertising value." They also have educational value. Moreover, there is no highly organized pressure from the outside to make use of these materials. Advertising does not necessarily do us harm, anyway. The same cannot be said of pressures of organized propaganda for political ideologies, for religious dogma, for economic theory, and the like.

It is true that there are many things we cannot teach approvingly or even impartially. It is also true that these restraints are not confined to the public schools. Persons in politics, government, and business, and in the churches, are under like restraint. A newspaper may be relatively free to write unfavorably about some small religious sect, but not about a large or powerful church body. The entertainment world can be pretty rough on mother-in-laws, but this is because they are not organized. In our large industrial empires, in politics, and in our colleges and universities, private as well as public, men who wish to advance know that it does not pay to get too far out of line. Freedom of speech may be a legal fact except when Communism is involved, but everywhere else there are penalties. Freedom of thought and

speech are simply not tolerated in many spheres of American life.

Of course our schools are overwhelmingly committed to the best interest of our nation. But there is room for disagreement as to what this is. We should teach history as history is. We should teach present-day American life as it is, insofar as we understand it. Our country's history is good enough and its present-day vitality is strong enough to withstand criticism. How can we educate for freedom of thought and action if we do not practice these democratic virtues in the classroom!

Most of the persons who have invoked the Fifth Amendment within recent years have lost their jobs. Freedom tends to become a mere legal fiction if the Department of Justice can nullify the Fifth Amendment by granting legal immunity. Freedom to stay out of jail is not the only kind of freedom. We can all applaud our government's efforts to keep Communists out of government. But if the Fifth Amendment can be set aside for one purpose, it can at a later time be set aside for another purpose. Immunity from prosecution profits a man little if he is denied the means of supporting himself and his family. As Robert Maynard Hutchins has said in effect, it should not be necessary to act in an un-American way to prove that we are Americans.

Our real concern about freedom of speech and thought in our schools is the development of a generation in which citizens are free to think and act without evoking all kinds of penalties that can be applied in a complex society. These issues go much further than Communism. That is but a current symbol. The employment offices of some of our universities have been distributing free literature to graduates seeking positions in business and industry, pointing out the advantages of conservative thought and action. We need to rethink the whole question of freedom in America. Even colleges and universities like to promote to responsible positions professors who are not too radical in their thinking. Actually, there is some sense in this, because radical thinking may embarrass an institution. But this can only mean that the citizens will not tolerate freedom of thought.

Religious freedom in America, about which we have congratu-

lated ourselves daily for over two hundred years, is little more than a legal fact. And certain unpopular religious sects have had occasion to doubt that freedom of worship is even a legal fact. Neither a Jew nor a Roman Catholic has ever filled the office of President of the United States. Can it be that men of these faiths are not politically ambitious? And could we believe that Protestants would have much chance at this office if they were in the minority?

Jefferson thought America meant *equal rights for all and special privileges for none*. The President's Committee in 1947 spelled this out so as to leave no doubt that it goes beyond rights before the law:

- the right to safety and security of the person
- the right to citizenship and its privileges
- the right to freedom of conscience and expression
- the right to equality of opportunity

Who is to enjoy these rights? All citizens, none more than others. Anyone acquainted with the facts knows that these rights are not shared equally. Even our enemies have embarrassed us before the world because of that fact. It is *no* excuse for us that their egalitarianism for themselves of which they boast may mean little more than the right to share a lot that is equally bad for all. Moreover, the fact that it is our enemies who use these arguments against us does not mean that they are not valid. In a complex, interdependent society the extralegal penalties—the things we do to one another day by day because of religion, race, social status, thought, or national origin—certainly recommend the rethinking of our democratic rights. There is no better place to start than in our schools.¹⁵ If we would learn to live up to our tradition and ideals, we would raise in the world of nations a bulwark against our enemies equal to the might of military forces.

Perhaps we have never fully appreciated the meaning of our legal safeguards. But laudable as these are, they are not enough. What the schools can do is not enough either, operating as they

¹⁵ Cf. L. and E. Cook, *Intergroup Education* (New York: McGraw-Hill Book Co., 1954).

do in a social setting of many other powerful educational forces. A resurgence of conscience everywhere is overdue.

ADDITIONAL REFERENCES

- Baker, M. C., *Foundations of John Dewey's Educational Theory*. (New York: Columbia University Press, 1955)
- Brown, F. J., *Educational Sociology*. (New York: Prentice-Hall, 1954)
- Commager, H. S., *The American Mind*. (New Haven: Yale University Press, 1954)
- Havighurst, R. J., *Human Development and Education*. (New York: Longmans, Green and Co., 1953)
- Hullfish, H. G., *Keeping Our Schools Free*. (New York: Public Affairs Committee, 1953)
- Lee, G. C., *An Introduction to Education in Modern America*. (New York: Henry Holt and Co., 1953)
- Mort, P. R., and Vincent, W. S., *Introduction to American Education*. (New York: McGraw-Hill Book Co., 1954)
- Myers, A. F., and Williams, C. O., *Education in a Democracy*. (New York: Prentice-Hall, 1954)
- Rugg, H., and Withers, W., *Social Foundations of Education*. (New York: Prentice-Hall, 1955)
- Taylor, H., *On Education and Freedom*. (New York: Abelard-Schuman, 1954)
- Zubek, J. P., and Solberg, P. A., *Human Development*. (New York: McGraw-Hill Book Co., 1954)

II

EDUCATION AND SOCIAL CLASS

Social-Class Placement

SOCIAL-CLASS STRUCTURE in the over-all educational picture is very important. So that we may the better recognize the signs of social class, let us, at the outset, consider some of the details of one of the most comprehensive scales for determining social class, the Warner Index of Status Characteristics.¹

Although a great deal of work was entailed in the construction of this scale, the scale itself is relatively simple and can be used by workers who are by no means specialists in class structure. The first step was to determine the social-class placement of each of a few hundred persons in various communities. Such a procedure requires trained interviewers, thoroughly familiar with the sample communities and well versed in social-class phenomena.

In the construction of intelligence tests, the requirement is a sample of people who are ranked in intelligence by various independent criteria. The test designer then sets about to find a number of easily administered and easily scored test items that will rank the people in the sample the same way that the criteria rank them. In principle, this is the way Warner and his associates proceeded. They constructed a scale that would place the individuals of their sample in the same order of rank in which the

¹ W. L. Warner, M. Meeker, and K. Eells, *Social Class in America* (Chicago: Science Research Associates, 1949).

TABLE I

SCALES FOR MAKING PRIMARY RATINGS OF FOUR STATUS
CHARACTERISTICS

<i>Status Characteristic and Rating</i>	<i>Definition</i>	<i>Status Characteristic and Rating</i>	<i>Definition</i>
OCCUPATION: ORIGINAL SCALE		SOURCE OF INCOME	
1. Professionals and proprietors of large businesses		1. Inherited wealth	
2. Semi-professionals and smaller officials of large businesses		2. Earned wealth	
3. Clerks and kindred workers		3. Profits and fees	
4. Skilled workers		4. Salary	
5. Proprietors of small businesses		5. Wages	
6. Semi-skilled workers		6. Private relief	
7. Unskilled workers		7. Public relief and non-respectable income	
HOUSE TYPE: ORIGINAL SCALE		DWELLING AREA	
1. Large houses in good condition		1. Very high; Gold Coast, North Shore, etc.	
2. Large houses in medium condition; medium-sized houses in good condition		2. High; the better suburbs and apartment house areas, houses with spacious yards, etc.	
3. Large houses in bad condition		3. Above average; areas all residential, larger than average space around houses; apartment areas in good condition, etc.	
4. Medium-sized houses in medium condition; apartments in regular apartment buildings		4. Average; residential neighborhoods, no deterioration in the area	
5. Small houses in good condition; small houses in medium condition; dwellings over stores		5. Below average, area not quite holding its own, beginning to deteriorate, business entering, etc.	
6. Medium-sized houses in bad condition; small houses in bad condition		6. Low; considerably deteriorated, rundown and semi-slum	
7. All houses in very bad condition; dwellings in structures not intended originally for homes		7. Very low; slum	

interviewers had placed them, upon the basis of intensive study and after talking with many other people in these communities relative to the social-class placement of the persons comprising the sample. This resulted in the ISC, Index of Status Characteristics.

One edition of this scale is reproduced in Table I.² The reader will observe that each of the four categories breaks down into a subscale of seven points. The numerical value accorded in each case is multiplied by an assigned weight value, as is seen in the following example for a hypothetical case:

<i>Status Characteristic</i>	<i>Rating</i>	<i>Weight</i>	<i>Rating x Weight</i>
Occupation	4	4	16
Source of Income	5	3	15
House Type	5	3	15
Dwelling Area	4	2	8
Total			54

This procedure leads to a combined numerical score for each person rated. By consulting Table II, the reader can see that our hypothetical case falls in the upper-lower class.

TABLE II
SOCIAL CLASS EQUIVALENTS FOR ISC RATINGS
FOR OLD AMERICANS, JONESVILLE

<i>Weighted Total of Ratings</i>	<i>Social Class Equivalents</i>
12-17	Upper Class
18-22	Upper Class probably, with some possibility of Upper-Middle Class
23-24	Indeterminate: either Upper or Upper-Middle Class
25-33	Upper-Middle Class
34-37	Indeterminate: either Upper-Middle or Lower-Middle Class
38-50	Lower-Middle Class
51-53	Indeterminate: either Lower-Middle or Upper-Lower Class
54-62	Upper-Lower Class
63-66	Indeterminate: either Upper-Lower or Lower-Lower Class
67-69	Lower-Lower Class probably, with some possibility of Upper-Lower Class
70-84	Lower-Lower Class

² This and Tables II and III are reproduced by permission of the publishers, Science Research Associates.

In the past, designers of scales of social and economic status usually made use of the category "Amount of Income." Such a category was originally included in the Warner scale, as was also the category "Education," making six categories altogether. The authors found that a scale based upon six categories did not correlate with the criterion (social-class placement) to an appreciably greater extent than one based upon four categories. The coefficients for the samples used were found to be .974 for the six categories and .972 for the four categories.

Warner chose to retain "Source of Income" at the expense of "Amount of Income," chiefly on the ground that interviewees were found to be less reluctant to divulge the source of income than to tell the amount. Then too, "source" seems to have some special significance, especially at the two extremes. Some peculiar significance attaches to old money. New money does not carry the same prestige. Money somehow improves with age. Though it may have been earned in the slave traffic or in rumrunning, in due time it becomes acceptable for endowing cathedrals or founding institutions of learning. We all know the social stratum of a person who must eke out an existence on money received from charitable organizations or public funds. How different it is with someone who manages to get along on an inheritance of like amount from the estate of some distant relative!

The reader may be interested in the correlations obtained between each of the categories and the criterion, social-class placement. These are found in Table III. The intercorrelations between the six categories ranged from .59, between Education and Amount of Income, to .87, between Occupation and Amount of Income. Some of the other intercorrelations are as follows: Amount of Income and Dwelling Area, .81; Occupation and Education, .77; Occupation and House Type, .71. These intercorrelations highlight an interesting sociological phenomenon, as well as provide valuable information about the scale.

One further fact should be noted—that the general population is not distributed equally throughout the six class levels provided by this scale. The distribution would of course differ somewhat

TABLE III

CORRELATION BETWEEN EACH CATEGORY AND SOCIAL CLASS PLACEMENT
AND MULTIPLE CORRELATION BETWEEN FOUR CATEGORIES
AND SOCIAL CLASS PLACEMENT

Category	Correlation	Standard Errors of Estimate
Occupation	.91	1.8
Source of Income	.85	2.3
House Type	.85	2.3
Dwelling Area	.82	2.5
(Multiple R)	.97	1.0
Amount of Income	.89	2.0
Education	.78	2.7

for different cities. Hollingshead reported the following percentages for the youth of high-school age in "Elmtown," based upon a five-class system: Class I (the highest), .54%; Class II, 4.21%; Class III, 21.5%; Class IV, 42.4%; Class V, 31.3%.³ For his six-class scale, Warner presents the following percentages:⁴

U-U	1.4%	L-U	1.6%
U-M	10.0%	L-M	28.0%
U-L	34.0%	L-L	25.0%

The reader may wonder why the distribution takes this form. Why, for example, do we have only 3 per cent in the two upper-class levels and 59 per cent in the two lower-class levels? The people in U-U have certain common characteristics that differentiate them from other groups, and it is estimated that 1.4 per cent of the people in America have these characteristics. Similarly, the people in L-U have certain distinguishing characteristics, and it is estimated that 1.6 per cent of the people in America have these characteristics in common, and so on for U-M, L-M, U-L, and L-L.

³ A. B. Hollingshead, *Elmtown's Youth* (New York: John Wiley and Sons, 1949), p. 14.

⁴ *Op. cit.*, p. 14.

Selective Characteristics of Education in the United States

As has been noted, education at the elementary level has been tuition-free in our country almost throughout its life, and our secondary schools have been largely free for a hundred years. These schools are commonly referred to as public schools. So far as the purposes of the discussion to follow are concerned, parochial schools can be placed in the same category, for the most part. The elementary school has traditionally been referred to as the common school, presumably because the various branches of study were common to all the pupils. American high schools are tending toward a common school in a limited sense, in that they are moving in the direction of providing a high-school education for all youth in the high-school age range. Since the high school serves more than a single purpose, it has been necessary to diversify the program of studies to a considerable extent.

Within the last ten or fifteen years, we have had in high school about 75 per cent of the youth of that age range. Most educational leaders appear to be committed to the idea that this percentage should be a great deal higher. This, of course, would mean further diversification, and many other changes. Perhaps no more than one third of the youth in the general population can cope adequately with the traditional college-preparatory curriculum. It makes no sense to say that nearly all youth of appropriate age should be in high school, and to beckon them in, only to have them confronted with a program they cannot cope with and one that is otherwise unrealistic. The American high school has had a phenomenal growth. Fifty years ago, only about 10 per cent of the youth of this age range was in school. Barring some very recent developments, it can be said that the United States of America is almost the only large country that has offered public high-school education, the one exception being the Soviet Union.

Notwithstanding the educational opportunities provided at public expense, our program has not worked well at all social-class levels. What about the 25 per cent who drop out of school at the age at which it is legally possible for them to do so, or

sometime before completion of the secondary program? Or what about another 25 per cent who stay in school but who, because of indifference or for other reasons, do not do well? The vast majority of them come from the lower social classes.⁵ The reasons for this may be of greater educational significance than the phenomenon itself. In the next few pages there will be presented several conditions associated with the phenomenon, and which can stand as probable causative factors. There are three general groups of factors that seem especially pertinent. It will doubtless occur to the reader that these three groups are not entirely independent of each other.

First, there is the general fact that, with notable exceptions, lower-class youth do not do so well in school as do upper-class and middle-class youth. Second, for reasons to be noted presently, they are not so highly motivated. Third, frequently they are not closely identified with the social and extracurricular life of the school. Conditions for the development of the feeling of belonging are unfavorable.

Success in school. It is a notable fact that academic achievement is significantly related to social-class status. Some twenty years ago Engle investigated the relationship between home environment and school marks for a large group of high-school students.⁶ Letter grades for privileged and underprivileged groups were reported as follows, in percentages:

	A	B	C	D	E
Privileged	18.6	30.9	28.2	17.8	4.5
Underprivileged	4.7	17.6	33.3	32.3	12.1

⁵ This fact is highlighted in Hollingshead's *Elmtown's Youth*, already cited, and in *Adolescent Character and Personality* by R. J. Havighurst and H. Taba (New York: John Wiley and Sons, 1949). An earlier book that contributed especially to a general awakening to the problems in this field was H. M. Bell's *Youth Tell Their Story* (American Council on Education, 1938). See also B. D. Karpinos, "School Attendance as Affected by Prevailing Socio-economic Factors," *The School Review*, 51 (1943), 39-49.

⁶ T. L. Engle, "Home Environment and School Records," *The School Review*, 42 (1934), 590-98. Other investigations cited: A. N. Hieronymus, "A Study of Social Class Motivation: Relationship between Anxiety for Education and Certain Socio-Economic and Intellectual Variables," *Journal of Educational Psychology*, 42 (1951), 193-205.

The semester grades for Elmtown's youth are reported by Hollingshead by social class. These are presented in Table IV.⁷ Grades are in percentage scores.

These results are typical. Information of this character may be used to explain why underprivileged students drop out of school, but it does not, of course, explain why they do poorly in school. There are other facts that logically should help to explain the relationship found between social class and academic success. One is the fact that performance on intelligence tests is related to social-class status, as well as to achievement. This relationship itself poses some complicated issues; it requires explanation. The experimental data and some of the issues involved will be discussed in a later chapter. Suffice it to say for the present that the differences between upper and lower classes are quite substantial. The

TABLE IV

PER CENT OF STUDENTS IN EACH SOCIAL CLASS
RECEIVING GRADES WITHIN A GIVEN RANGE

Social Class	Grade Range		
	85-100	70-84	50-69
I & II	51.4	48.6	00.0
III	35.5	63.2	1.3
IV	18.4	69.2	12.4
V	8.3	66.7	25.0

mean IQ of upper-class pupils and those of the upper-middle class combined is about one standard deviation (16 Stanford-Binet IQ points) above the general population mean of 100. The mean IQ for the lower class is about .5 standard deviation (8 IQ points) below 100. The mean IQ of the upper group just described, 116, is at the 84th percentile in the general population; that of the lower class, 92, is at the 31st percentile in the general population. It should be remembered that these values, 116 and 92, are means for the two groups, and that the earned IQ's of the two groups will distribute widely on both sides of the means.

⁷ Hollingshead, *op. cit.*, p. 172.

It should be noted that differences in intelligence-test performance among the various social classes do not tell the whole story. When test performance is held constant, as by matching in IQ and chronological age pupils from different social classes, or by the technique of partial correlation, there is still a significant correlation between social class and academic achievement.⁸

The problem was approached in another way by Granzow.⁹ He selected two groups of sixth-grade pupils matched in IQ's but differing in performance on reading tests. One group earned reading scores one and one-half years or more below the sixth-grade mean, the other, one and one-half years or more above the sixth-grade mean. Home-background ratings obtained were decidedly in favor of the accelerated group.

This investigation and other kinds suggest that the home life of children of different classes exerts differential and educationally important effects. In another investigation, Eller interviewed the parents of a large number of 1st-grade pupils relative to their before-school experiences, and subsequently secured Warner Index of Status Characteristics scores on the parents.¹⁰ In connection with this work, he drew up an extensive list of experiences that ideally, before-school children should have, in the opinion of a jury of experts. This instrument was administered to the parents. Again, significant relationships were found between social-class position and adequacy of before-school experiences of the children.

The sum total of the evidence is to the effect that the before-school experiences of upper- and upper-middle class children

⁸ J. B. Stroud, "Predictive Value of Obtained Intelligence Quotients of Groups Favored and Unfavored in Socio-economic Status," *Elementary School Journal*, 43 (1942), 97-104; D. C. Shaw, "The Relation of Socio-economic Status to Educational Achievement in Grades Four to Eight," *Journal of Educational Research*, 37 (1943), 187-201.

⁹ K. R. Granzow, "A Comparative Study of Underachievers, Normal Achievers, and Overachievers in Reading," Doctor's Dissertation, State University of Iowa, 1954.

¹⁰ W. Eller, "Relationships between Certain Socio-economic Factors and the Experience Backgrounds of First Grade Children," Doctor's Dissertation, State University of Iowa, 1951.

seem to equip them better for their subsequent school experiences than do those of lower-class children. Significant differences are found in such important areas as travel, constructive play materials, children's books, children's stories, language development, attitudes toward learning, general information, and other experiences helpful to children later in schoolwork. Of course, kindergarten and elementary teachers engage in considerable "readiness" work and seek in many ways to enrich the experience background of young children. But those who enter school with a good start profit from readiness work also, and seem to progress faster. As a result, the children from unfavored homes never quite catch up.

Class differences in motivation. Helping to explain differences in school success as among social classes, and also social-class differences in continuation in school, are such factors as class differences in rewards, sanctions, expectations, social pressures, and social example. The American public school is characteristically a middle-class institution. It is committed to middle-class standards and values. Pupils are expected to conform, to meet the demands made upon them, to succeed, to be prompt, neat, and to do their work well. These are the kinds of demand made upon them in middle-class homes. These are the kinds of thing for which middle-class children are praised and rewarded. They are the things they see being done around them at home and in the neighborhood. They are less conspicuous in the lives of lower-class children.

Lower-class youth of sixteen or seventeen (the age depending upon state statutes) have a genuine choice about continuing in school or dropping out. Social pressures in this respect rest lightly upon them. Middle-class and probably upper-class youth, but especially middle-class, do not really have a free choice. They have been led to expect everything good from the school. Their parents and their parents' friends and associates attended high school; many of them attended college. They place a high value upon education. The youth's own friends and associates have like plans and aspirations. Should a middle-class boy raise a question about dropping out of high school and getting a job, his parents

might feel like sending him to see a psychiatrist. Almost certainly, such an issue would not be treated lightly.

We may suppose that youths' expectations in life, their life roles, are acquired to a large extent from their parents and from others of like status in the community.¹¹ Hieronymus found that the life expectations of 9th-grade pupils—their occupational goals, their expectations with respect to civic and cultural participation in the life of the community—even the kind of neighborhood they expected to live in—were closely related to social-class status.¹² It seems clear that in the case of youth of higher social status the realization of these expectations is predicated upon successful completion of a greater number of years of schooling than is the case with lower-class youth.

Not only do different social classes provide different models of imitable conduct, but they also foster a different type of social anxiety. John Locke's declaration made in 1690 seems fresh and true today: "Love of credit and apprehension of shame and disgrace are, of all others, the most powerful incentives of the mind, once it has come to relish them." Anxiety about social approval and disapproval is of course learned, and when learned, becomes one of the principal motivating forces in life—perhaps under normal social circumstances the most pervasive and compelling motive of all. It is the nature of self, once self-consciousness develops in a child, to be concerned about the evaluative reactions of others. Approval of others is pleasurable and therefore sought after. Disapproval is unpleasant and therefore eschewed. Moreover, approval and disapproval of those with whom the child is positively identified—his parents, his teachers, his peers—is of special consequence to him.

The school child is probably moved much less by the ultimate inherent social usefulness of what he learns in school than by the attitudes of those with whom he is identified in a positive way. Inasmuch as reward and punishment vary with social class, these,

¹¹ A. Davis and R. J. Havighurst, *Father of the Man: How Your Child Gets His Personality* (Boston: Houghton Mifflin Co., 1947).

¹² Hieronymus, *loc. cit.*

as they become internalized, lead to anxieties about different things. Davis and Havighurst investigated differences between middle- and lower-class families, both white and colored, in child-rearing practices.¹³ In their sample, more lower-class babies were breast-fed, had the breast or bottle longer than twelve months, were weaned later. Lower-class children stayed up later, stayed on the streets longer, and went to movies more often than middle-class children. On the other hand, middle-class parents started toilet training earlier, expected their children to help with household duties and assume responsibilities earlier.

Davis reports that lower-class families are more concerned about food, shelter, clothing, fuel, light, and similar physical necessities.¹⁴ Lower-class children were permitted longer periods of gratification of their biological needs and were not subjected so early to the mores and taboos respecting cleanliness, eating, and sleeping habits. There was correspondingly less nail-biting, thumb-sucking, genital play—which, incidentally, Davis attributes to their being frustrated less. On the other hand, middle-class parents are much more exacting relative to cleanliness, feeding, toilet training, sex inhibitions, thumb-sucking, defacing property, and the like. Lower- and middle-class cultures teach children anxieties about different things. Some of those differences related to school practices as suggested by Davis are as follows: middle-class children are taught to fear poor grades, disapproval and punishment for transgressions of school code, swearing, fighting, and early sex relations. Lower-class children are not taught to fear these things. They are more likely to be anxious about just the reverse in each case. They are more likely to fear good grades than poor ones, or teacher approval than disapproval.

School is likely to be a satisfying place—children are likely to become positively identified with it—in proportion to the extent to which it becomes a means of satisfying children's basic cul-

¹³ Reported in A. Davis, *Social Class Influences upon Learning* (Cambridge, Mass.: Harvard University Press, 1948).

¹⁴ *Ibid.*

turally derived motivations. And two-thirds of the children in our schools are from the two lower social classes.

In large urban centers whole school districts are sometimes comprised of slum areas. In a great many schools, lower-class children do not come in contact with middle-class children. What about our smaller cities and towns where lower- and middle- and even upper-class children may attend the same school; or our village and rural schools where children of sharecroppers or those down along the river or across the tracks may attend the same schools as other children? Do they adopt the customs, the ideals, and the anxieties of the middle-class group? Perhaps they may to some extent; but, as will be seen presently, there are some very real barriers in the way of their doing so.

Participation in school activities. In another and extremely important area of educational experience, participation in the social and extracurricular life of the school, large social-class differences are found. Several years ago Smith, in investigating participation in extracurricular activities of high-school students, found differences for nearly all activities.¹⁵ Using the Sims Score Card for measuring socioeconomic status, he found the mean score of the participants to be above the school mean in 28 out of 31 activities. Twenty of the differences were significant at the 1 per cent level of confidence. His findings confirmed earlier work by Wright.¹⁶

In his "Elmtown" investigation, Hollingshead reports a number of illuminating facts about cliques and clique relations.¹⁷ His inquiries brought to light 259 cliques. Of these, 106 were school cliques, growing out of school relationships, consisting of from two to nine persons in the case of boys and two to twelve in the case of girls, with modes of five. There were found to be 120 recreational cliques, with a great deal of overlapping in membership

¹⁵ H. P. Smith, "A Study of the Selective Character of American Public Education: Participation in School Activities as Conditioned by Socio-economic Status and Other Factors," *Journal of Educational Psychology*, 36 (1945), 229-46.

¹⁶ D. Wright, "Student Participation in Extra-curricular Activities by Welfare Levels," Master's Thesis, Stanford University, 1939.

¹⁷ *Op. cit.*

with school cliques. The modal size was four. Thirty-three cliques were classified as institutional, growing out of such organizations as Sunday school and Scouts. The social pressures exerted by clique groups can be quite strong. They influence dating activities, and affect the social life of adolescent boys and girls in a number of ways. There was found to be a pronounced tendency for cliques to form along school-class and social-class lines. In the case of 54 per cent of the boys and 60 per cent of the girls, the clique membership came from both the same school class and the same social class. Of the others, 32 per cent (boys) and 26 per cent (girls) came from the same school class but outside the social class; 12 per cent (boys) and 13 per cent (girls) came from outside the school class but from the same social class; 2 per cent (boys) and 1 per cent (girls) came from outside both school class and social class. Considering social class alone, Hollingshead reports that of 1258 clique ties, three out of five involve boys and girls of the same social class, two out of five involve those of adjacent social classes, while only one out of 25 ties are between adolescents separated by as much as two social-class levels on a five-level scale. To the same purpose is the fact that 71 per cent of the named "best friends" of social class I and II boys were from the same two social classes. The remainder were from class III. The named "best friends" of 37 per cent of class V boys were from class IV; 63 per cent were from class V. Similar findings are reported for girls.

Hollingshead found large social-class differences at "Elmtown" in attendance of the more formal school activities such as athletic events, school dances, and plays. For athletic events, 90 per cent of the students in social classes I and II "seldom missed a game." Almost half of class V students attended no games. None "attended most games." Results for other activities were similar.¹⁸

There is convincing evidence that the informal social life of the high school is functioning to perpetuate and possibly further the social-class system in America. Upward mobility is not conspicuous here. As far as the informal social life of the school is con-

¹⁸ *Ibid.*, Chap. 8.

cerned, the American high school is in no sense a part of the "great melting pot," if these results are at all typical.

In investigating extracurricular participation of high-school juniors and seniors in a Midwestern city of about 70,000, Humphry found participation to some extent on the part of more than 90 per cent of the group.¹⁹ Accordingly, she sought to determine the relationship between extent of participation and prestige value of the activities on the one hand and academic achievement, intelligence scores, and occupational class on the other. The results are shown in Table V. Brightness, academic achievement, and occupational class are all positively related to participation

TABLE V
CORRELATIONS BETWEEN PARTICIPATION IN EXTRACURRICULAR
ACTIVITIES AND OTHER VARIABLES

<i>Participation</i>	<i>Occupational Class</i>		<i>IQ</i>		<i>Achievement Scores</i>	
	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS
Extent of Participation	.37	.40	.39	.42	.44	.43
Prestige Scores	.36	.41	.43	.47	.50	.48

scores, and to the same degree, more or less. Of course, the three predictive measures are all interrelated—that is, correlated with one another. "Holding intelligence constant," she obtained partial correlation coefficients ranging from .30 to .37 between occupational class and measures of participation.

Some Practical Problems

It has already been shown that there is a strong tendency for lower-class youth to drop out of high school. Hollingshead gives the following percentages of in-school youth by social class for "Elmtown": I, 100; II, 100; III, 92.4; IV, 58.7; V, 11.3. Let us suppose that most of the "dropouts" come from the lower-lower and upper-lower classes, on the Warner scale. It will be recalled

¹⁹ B. Humphry, "Participation in Extra-curricular Activities as Related to Occupation Class and Academic Ability," Master's Thesis, State University of Iowa, 1951.

that it is estimated that 59 per cent of American families are in these two classes. The percentage of youth of high-school age from these classes probably exceeds this figure, since lower-class families are larger than middle- and upper-class families. But let us take the value 59 per cent as representing the proportion of all youth of this age range belonging to the two lower classes (U-L and L-L). In the foregoing pages a number of probable causes for the high incidence of dropping out in these classes have been discussed. One was the fact that a disproportionate number of the youth are dull, at least in the sense of having earned low scores on intelligence tests. But they are not all dull. Almost one-third of them are above the general-population average. Thus there must be many very able lower-class boys and girls who drop out of school.

As noted earlier, the mean IQ of lower-class children is about 92. Let us assume for this class a mean IQ of 92 and a standard deviation of 16 IQ points.²⁰ For this group, an IQ of 100 would be .5 SD, 8 IQ points, above the mean. If we consult an appropriate table in a book on statistics, we find that in a normal distribution, 31 per cent of the area, or here 31 per cent of the cases, fall at or above .5 SD—in our case, at or above an IQ of 100.

Now let us suppose we have a random sample of 10,000 children of school age, out-of-school as well as in-school children. We would, by our figures, expect to find 59 per cent of them in the two lower classes, or 5900. Thirty-one per cent of this number is 1829.

In the two upper classes (3 per cent) and the upper-middle class combined, we have 13 per cent of the families, and as before, let us assume, 13 per cent of the children, although the percentage

²⁰ This is approximately the SD of the Stanford-Binet IQ for the general population. One might suppose that the SD for lower-class children alone or upper-class children alone would be somewhat lower. However, K. Eells *et al.*, *Intelligence and Cultural Differences* (Chicago: University of Chicago Press, 1951), for their Rockford, Illinois, study, found the SD's of IQ's on various tests for low and high social-class groups (of 13- and 14-year-old children) to be almost as high as SD's for the entire sample. See pp. 118 and 154.

is doubtless less. The mean IQ of these groups taken together is about 116. Again let us assume an SD of 16 IQ points. In our hypothetical sample of 10,000 children drawn at random we would have 1300 children in these three classes (U-U, L-U, and U-M). Their mean is 1 SD above the population mean of 100. Again, consulting our statistical table, we find that 84 per cent or 1092 would have earned IQs of 100 or above.

Let us go a step further, making the same assumptions and using the same procedures. We would expect one-half of our 1300 upper-class and upper-middle class children to earn IQ's of 116 or above. This is about the average IQ of college and university freshmen. We would expect 7 per cent of our 5900 lower-class children, or 413 (as opposed to 650), to earn IQ's of 116 or above.

Since our assumptions regarding the percentages of children represented in the various social classes are on the conservative side, we may be justified in saying that the two lower classes contribute about twice as many children who would be expected to score IQ's above 100 as do the combined contribution of the two upper classes and the upper-middle class. They also probably contribute almost as many who can score IQ's above 116. Practically all upper- and upper-middle class boys and girls attend high school and persist until graduation. Less than half of those of the lower class do so. Of the lower-lower class, the percentage may be less than 10.

As one would suppose, many boys and girls of better than average mentality drop out of high schools. This is not to say that it is more unfortunate for bright pupils to drop out than for average or dull ones to do so, but it does pose different problems. At present, only limited information is at hand on the frequency of "dropouts" of above-average pupils. It may not be very high for extremely bright pupils, but it is almost certainly considerable for the "above-average" category in general. Phearman's investigation at the college level is suggestive.²¹ In an extensive sample of high-

²¹ L. T. Phearman, "Comparisons of High-School Graduates Who Go to College with Those Who Do Not," *Journal of Educational Psychology*, 40 (1949), 405-14.

school graduates, he found that the great majority of those very able academically were enrolled in college the year following graduation. Of the top 2 per cent on the Iowa Tests of Educational Development (ITED) of high-school graduates, 96.7 per cent of the boys and 87.5 of the girls were in college. At this extreme level of ability, socioeconomic status did not make much difference in college attendance. At the lower levels, it appeared to be quite a factor.

For a sample of 254 “dropouts” for a given school year in a certain city, Snepp reports that 60 per cent of the girls and 49 per cent of the boys had scored IQ’s above 90, whereas 28 per cent of the boys and 26 per cent of the girls had scored IQ’s above 100.²² Dillon, in an investigation of “dropouts” in four cities, reports the following distribution of IQ’s: ²³

	Above 114	105-114	95-104	85-94	Below 85
No.	56	138	238	266	386
Percentage	5	12	22	25	36

K. Humphry collected a number of recorded interviews with a small sample of high-school “dropouts” who scored above average on the Iowa Tests of Educational Development, and collected other pertinent data.²⁴ His principal findings and observations are summarized as follows: (1) While these students stated that help and advice were available when required, they did not feel free to approach teachers and other persons in a position to help them. (2) They complained of a lack of practical value of much of the school’s program, although the investigation was conducted in one of the more enlightened school systems. (3) They felt discriminated against by their peers. Socially favored youth “ran the school,” and “had priority in dating and in the extracurricular

²² D. W. Snepp, “Why They Drop Out,” National Association of Secondary School Principals, *Bulletin* 35, No. 180 (1951), 137-41.
²³ H. J. Dillon, *Early School Leavers* (New York: National Child Labor Committee, 1949).
²⁴ K. Humphry, “Case Studies of Ten Talented Students Who Withdrew from High School before Graduation,” Master’s Thesis, State University of Iowa, 1951.

programs." The lower-class youth, they reported, "felt inferior, like outcasts, not wanted." (4) The worker felt that lack of pressure at home for continuance in school and lack of parental concern about their children's progress in school were important contributing factors. (5) Poor teacher-pupil relationships, especially sarcasm, favoritism, and lack of sympathy upon the part of teachers, came in for considerable attention. Remember, these are things these "dropouts" reported. It would be difficult to determine how much is justification of their action and how much is cause. Obviously, some of the responsibility for failure to adjust to school life must lie with the pupil. But we must admit that some of the problems faced by this group of students were aggravated by an unfavorable social-class position.²⁵

Close to two-thirds of our youth come from the lower class. It seems clear that American secondary schools are exerting comparatively little effect upon this group as a whole. Nevertheless, the fact that educational opportunities have existed in our traditional secondary schools for boys and girls of all social classes with ability and a will has doubtlessly contributed to the safety of our democratic society. This we should not forget. But at the same time, when we take stock, it must appear that much remains to be done. Our high schools scarcely touch the lives of millions of lower-class youth.

In a general sense, the teachers' task is to make school life more eventful. Schools must compete with opportunities for earning money, freedom from restrictions. Also they impose privations and a certain tedium incident to the school routine. The boy or girl who sees school as a means of satisfying the needs of young adolescents, a means of self-realization, a means of gratifying the need of a sense of self-worth, and as a means of doing these things better than can be done by other available opportunities, will remain in school. School can be seen as a good place to be if the

²⁵ Cf. W. L. Gragg, "Some Factors Which Distinguish Drop-Outs from High School Graduates," *Occupations*, 27 (1949), 457-59; D. W. Snapp, "Why They Drop Out: Eight Clues to Greater Holding Power," *Clearing House*, 27 (1953), 492-94.

pupil experiences success, if he belongs, or feels he belongs, to the social life of the school, has some good friends there, has a part in the activities, and feels that the school's program is worth while.

We should be more realistic in the setting-up of learning tasks at which these students can succeed, but tasks that are also educationally worth while. It is not just success, but success in something regarded by the pupil as worth while, that counts. To hold the students we are now losing, we may have to resort to more work with the hands, we may have to pay more attention to preparation for occupations. At least these things may be the core of the program. But the learning of many things of cultural and general educational value can be correlated with this work. It should provide opportunities for creative and imaginative work. Above all, it should encompass those features of training which are important for citizenship, and for community and home living. None of these things can function well if the students who participate in them are looked down upon by other students and the teachers, no matter how conscientiously they apply themselves. The dignity of this kind of education must be built up. The student who pursues such an educational program must not feel discriminated against and excluded from full participation in the rich social life of the school and its many activities.

As was suggested earlier, when a student is invited into our high schools, he has a right to expect the opportunities for success and the opportunities for participation shared by other students. He should be rewarded by recognition of all his constructive effort. When he has successfully completed the program commensurate with his abilities, as conceived by his teachers, he should receive his high-school diploma in the same way that college-preparatory students and others do. This will of course mean that we should educate the public, including college registrars, as to our purpose. A college official or a prospective employer who wants to know what kind of curriculum the graduate pursued, his scholastic attainments, or his academic aptitude, can easily find out.

It stands to reason that lower-class boys and girls will initially be more attracted to some kind of practical program than to an academic one. Their home and community experiences, their vocational aspirations and outlook on life, suggest this. Is such diversification likely to put our schools in the position of promoting and aggravating social-class stratification? There is certainly a danger that it will do so.

Lower-class boys and girls are lower-class to start with. School does not contribute to the perpetuation of class structure if it goes about arranging the best educational program these students are (1) capable of coping with and (2) motivated to undertake. The danger comes when the schools make it difficult to get from one curriculum to another in a diversified program. An academically able lower-class student may, of course, start in an academic curriculum if he can be interested in doing so. If he starts in a different curriculum and later awakens to the possibilities of an academic curriculum, he should be encouraged to make the change, and the machinery for doing so should be complicated as little as possible. If we teachers take as our goal the development of each student in accordance with his abilities, subject to our ability to interest him genuinely in such development, regardless of social class, school can become a means of improving social and economic well-being and raising the educational level of all the people.

Some Problems of Social Maladjustment

This chapter has been concerned briefly with social-class inequalities in school. We have seen that these inequalities extend to the formal learning in the classroom, to the informal learning as provided in the extracurricular and social life of the school, and to continuance in school beyond the legal requirements. This is not all. The school is concerned with problems of social adjustment and maladjustment, with character formation. It is a commonly accepted sociological phenomenon that the great majority of the youth found in state training schools and reformatories,

and in parental schools, special classes, and special schools operated by boards of education in many of our larger cities, come from the lower social classes, as do those who pose constant disciplinary problems in our regular schools. By and large our schools do not touch the lives of these youth in the vital way they should. We cannot escape responsibility with the excuse that most of those who get into serious trouble are not in school. If the school really made the impact upon them it should, they would probably be in school.

How do we propose to reform these youth? How do we propose to prevent their becoming problem children, truants, or delinquents? How do we expect special teachers, special classes, special schools or, finally, state training schools and reformatories to accomplish what others have failed to accomplish? Some seem to think that what such youth need is stern discipline, a firm regime where they will have to toe the mark; a place where they will learn, under watchful eyes, that they cannot transgress society's codes and get away with it. They must be made to conform! Under proper surveillance they can, of course, be made to conform—so long as persons in authority are present. In thus conforming they will form the right habits! Apparently there exists some such notion as that if they conform long enough, habits of rectitude will become so ingrained that they will always prevail and so incline the youth toward acceptable paths.

On logical grounds it is easy to predict that these measures will do nothing of the kind. Habits are not self-sustaining, once formed. Habits are formed in the first place because their constituent acts are performed and rewarded. They continue as habits if the acts continue to be rewarding—that is, if they satisfy motivating conditions. Otherwise we would expect them to die away for want of anything to sustain them.

Behavior is controlled by reward and punishment. In the case of animals and young children the controls are largely external; they are applied by others. By reward and punishment we can teach an animal or a young child anything he is capable of learning. The habits thus formed, by external control, continue if they

continue to be performed and continue to be rewarded by the people in control. (As will be seen later, the psychologist is able to speak of punishment as reward, since both avoidance of punishment and anxieties about punishment are assumed to be rewarding.) When conditions change so that the people in authority are no longer present to apply reward and punishment, the habits tend to disappear. They are not self-sustaining.

What is the basis of character formation in the first place? The starting point is the control applied by others, or by the pressures from the outside world. But this is only the starting point. The child must accommodate himself to these controls—not merely *conform* to the demands, but *accept* them. As Slavson has said, character is formed by the internalizing of restraints and controls imposed from without.²⁶

Internalizing them means accepting them as one's own. The individual thus becomes a part of the social system from which the demands stem. The ends and purposes of the restraints and controls become his own ends and purposes. These ends and purposes do not become his own because he is made to conform to them. They become his own because he becomes *positively identified* with the persons or institutions in a position to make the demands.

A child may conform to the demands made upon him without accepting, without positive identification, without internalizing. Indeed, he may become negatively identified with the people or the institutions in authority. When identification is positive, the people and the institutions become a positive force in the child's life. He accepts their ways, standards, and values. He accepts and seeks to adopt them. If identification is negative, the people and the institutions exert a repelling influence. Again, they may be able to enforce their demands in the face of negative identification; they may exact conformity, but not acceptance. They can exact conformity so long as they are in a position to do so. But the

²⁶ S. R. Slavson, *Introduction to Group Therapy* (New York: Commonwealth Fund, 1943).

ways, standards, and values do not become a part of the child's character.

What we must do in character training is to get from a circumstance in which all controls are external to one in which internal controls, self-controls, operate. A child must become able to act upon the basis of his own standards and values, not merely those imposed by the will of others. It has been noted that to begin with, there is external control only; that as the child becomes positively identified with those in authority, the controls and restraints and their ends are internalized. Now there is a condition for self-control. Now conditions have been established for self-reward.

What are the conditions that make for positive or negative identification? In general, it can be said that a child will become positively identified with those persons, institutions, or circumstances which satisfy his basic needs; that he will become negatively identified with those which thwart the satisfaction of these needs. In addition to biological needs, people everywhere give evidence of the need for self-worth, self-realization. This is seen in the need for love and affection, for success and recognition, for belonging in a group, and so on. There are also avoidance needs or drives. People seek to avoid pain, discomfort, punishment, and as anxieties build up in the course of mental development, disapproval.

Under the conditions of life prevailing in the lower social classes the controlling influences are frequently negative ones—punishment, fear of punishment or abandonment, and accompanying guilt feelings. In his practice of group therapy Slavson has sought to replace the negative, restraining influences with controls based upon positive identification (see Chapter XV).

With this general introduction, let us return to the thought that our schools do not make the impact they should make upon the lives and character of large elements of lower-class youth. To the extent that such boys and girls see the school as a place of privation, frustration, failure, and nonacceptance, if not rejection, there

is little chance of positive identification. Wherever these conditions prevail, there can be but little that is satisfying. Conformity we may exact if we are vigilant enough, but we will not gain acceptance, positive identification, internalization. A child must feel the joy of companionship with his school peers, of recognition and response freely given, of complete and unconditional acceptance by his teachers and others in authority, and of successful work experiences associated with activities perceived by him to be worth while—if he is to become positively identified with the school and its aims and values. The school must contribute to the satisfaction of the child's basic needs if it is to make any very lasting and positive impression upon him. This is the true meaning of reform, the true meaning of character formation. It is along such lines that the school must seek to discharge its obligations to underprivileged youth.

ADDITIONAL REFERENCES

- Bendix, R., and Lipset, S. M., *Class Status and Power*. (Glencoe: The Free Press, 1953)
- Jaffe, A. J., and Carleton, R. O., *Occupational Mobility in the United States, 1930-1960*. (New York: Columbia University Press, 1955)
- Keislar, E. R., "Differences among Adolescent Social Clubs in Terms of Member's Characteristics," *Journal of Educational Research*, 48 (1954), 297-303
- Moser, W. E., "The Influence of Certain Cultural Factors upon the Selection of Vocational Preferences by High School Students," *Journal of Educational Research*, 45 (1952), 523-26

III

MAN AND NATURE

The Rise of Man

WHAT WE ARE ABLE TO LEARN about man's past impresses upon us the suddenness with which this creature burst forth upon a boundless world. Surely the place has not been the same since. To us, it must seem that the men of ancient Babylon and Jerusalem lived long ago. In terms of human affairs, they did. Yet a little over a hundred generations take us back to their time in history. Take twice that number and we are back to the beginning of civilization. Six thousand years ago man began to till the soil. The resulting grain enabled him to live in a fixed abode. Because grain could easily be stored, and for long periods of time, men could live in cities. Many hands and minds could be turned to arts, crafts, and intellectual pursuits.

Whence came this creature that has so suddenly taken charge of the earth? First, let us take a brief look at the setting. The earth is currently reckoned to be about 3 billion years old—as science has estimated from the rate of “decay” of radioactive minerals. Traces of life date back about 600 million years. Life began in the sea. Presumably, plant life appeared first, since plants feed upon inorganic matter and could exist without animal life. The reverse is not true. Life came out of the sea onto the land about 400 million years ago.¹

¹ C. F. Weizsäcker, *The History of Nature* (Chicago: University of Chicago Press, 1949).

According to these figures, life has existed for about one-fifth of the earth's history. Inspecting geological-paleontological tables, we find as landmarks the ages of the following, among others, in millions of years: the shark, the great granddaddy of us all, 350; lobefins, 300; amphibia, 290; reptiles, 250; marsupials, 180; birds, 140 (the latter two and the following being warm-blooded); insect eaters, 100; apes, 80. The earliest finds of manlike creatures date back about 500,000 years. Only two or three of such have turned up. Since there probably were very few of these early creatures, the finding of any of them is a matter of chance, especially by anyone who would recognize them. It would be a mistake to assume that such beings did not exist earlier. Moreover, there have probably been more than a single species. The Java Man (500,000 years), the Peking Man, perhaps a little later, and even the relatively recent Neanderthal Man (50,000) probably were of different species. However, there is evidence that men of our species, *Homo sapiens*, appeared as long as 300,000 years ago. Recent research in methods of dating fossils may change our conception of their age.

In our time, a new human species would have tough going in the face of our guns and armies. Who is there to say, however, that some day *Homo sapiens* may not disappear completely, and that in some half-million years some other rational beings may not come forth? This would probably take some doing, since our fellow primates have probably specialized so long in a different mode of life (arboreal) as to make it unlikely that they would turn to our mode of development.

In a geological sense, a half-million years is a short period of time. Yet during this period man was changing rapidly. Whole species of man appeared and disappeared suddenly, as geological time moves. Then the cataclysm! Ten thousand years ago man was ignorant of metalcraft; six thousand years ago, of writing; twenty-five thousand years ago he had reached the high point in paleolithic culture. (The Indian has inhabited America about that long.)

The emergence of a completely new species of any kind is a

biological event of great moment. But what about the emergence of a species that established a wholly new mode of life, and on so vast a scale in so short a time, and did so in the face of a slow rate of turnover (perhaps 1000 generations since paleolithic times)! We have reason to believe that man has lived by his arts since the time of the earliest finds. Perhaps, biologically, man has had to live by his arts. It is likely that man came on during a period (glacial) that greatly hastened his evolution. Moreover, if earlier men had the propensity for killing each other off that civilized man has shown, we may suppose that contention with their fellows, as well as with the elements, hastened man's evolution. (Some think it likely that the Neanderthal Man met his fate at the hands of invading *Homo sapiens*.)

I do not see how we can escape the conclusion that man is physically descended from beings whom biology must classify as apes. However, these, our ancestors, can probably not be found among the apes living today. The present species have most likely developed past the point that branched off toward man. Fundamentally, this changes nothing in our descent from the apes.²

From the shark have evolved nearly all the fish of today. Some species, perhaps the lobefins, effected the transition from marine vertebrates to land vertebrates. All amphibian, reptilian, avian, and mammalian forms have evolved from them. The shark and the lobefin are only landmarks. They too evolved from lower forms. Their ancestors had ancestors, and so on back. The question of how the earth came to be populated with myriad living things is one of the great questions of the age. We do not know how life came into being, but we do know something of how it has evolved.

Darwin's theory of natural selection seems to say that what is fit to live, lives. But, as Weizsäcker remarks, that which is fit can live only after it has come into existence. Darwin's co-ordinate theory of chance variation is aimed at this aspect of the problem. Darwin did not know about genes, the determiners or carriers of

² *Ibid.*, p. 157. Quoted by courtesy of the publishers.

hereditary characteristics. The fact that geneticists can alter genes to some extent and produce variations in structure by subjecting the germ plasm of the parent to X rays or, more recently, to radioactive metals,³ supports rather than contradicts Darwin. In science, the word "chance" is more or less synonymous with "unknown" anyway. The last-named theory provides the principle by which plant and animal breeders have operated for years to produce new strains. Unable to produce variations, the breeder takes advantage of any that appear which suit his purpose. This is not natural selection, but it is selection, and tends to establish natural selection as a probability, although from the start the fact of natural selection has generally been accepted as plausible.

Before turning to the problem of race, where the attempt will be made to apply Darwin's theories to one of the great human phenomena, let us explore the subject of evolution a bit further. Procreation and death are the most stubborn facts of life. The only organisms that escape this cycle are the one-celled ones, which renew themselves by cell division. The cell ceases to exist, but does not die. When a great abundance of organisms are reproduced, the chances of mutation are increased. When there is an overabundance, the struggle for life is keen. These two conditions quicken the evolutionary process as conceived by Darwin. Thus death, as well as procreation, serves the "purpose" of evolution; death, to make room, because the earth can support only a limited number of living creatures.

Everywhere animals produce more than the world can support. Man is no exception, although civilization, with its arts, crafts, agriculture, and medical care, has certainly upset things. In terms of anything one could have predicted upon the basis of conditions existing twenty-five thousand years ago, world populations are today fantastic. True, this is a relatively recent phenomenon. Until

³ Recently, through the Atomic Energy Commission, domestic plant seed of many varieties are being subjected to varying degrees of radiation in a ten-acre circular plot of ground. The radioactive metals are placed in the center. The purpose is to speed up variations in gene structure—at least in germ plasm, to hasten the appearance of variations in plant characteristics.

modern times, disease, aided by the fact that populations were overflowing and mingling with other populations, served to keep the numbers far below what the earth could support. In Europe, for example, the population was relatively stable for a thousand years prior to the 1700s. Coulton tells us that in medieval England, where the population of the average village was about 300, sixty years were required, on the average, to increase the population by 8 persons.⁴

For a thousand years, the number of people on the continent had remained constant. From time to time there had been shifts in the areas of heaviest density. In some centuries, famine, plague, and war had temporarily lowered the total; in others, freedom from famine, plague, and war had temporarily raised it. But taken all in all these fluctuations canceled each other out.⁵

Between 1750 and 1850 the population of Europe rose from about 140 million to 260 million, and by 1950, to over 500 million.

Now we see great countries, especially India and China, vastly overpopulated. De Castro tells us that two-thirds of the people of the earth today are perpetually hungry.⁶ It does not help to argue that by dredging, irrigating, and introducing hybrid seeds, these countries could support themselves in abundance. They probably could for three or four generations, or until the population increased sufficiently to render the improved conditions inadequate. Nor does it avail anything to point to peoples of the British Isles or Holland, who live well but off other people's lands. No one can, of course, predict that any population will perpetually produce more people than can be comfortably fed. In France we have an example of a great country in which the population has not increased materially within the last hundred years. Civilization and human intelligence certainly are capable of upsetting nature's

⁴ G. G. Coulton, *Mediaeval Panorama* (Cambridge: The University Press, 1938), p. 89.

⁵ O. Handlin, *The Uprooted* (Boston: Little, Brown and Co., 1952), p. 25. Quoted by courtesy of the publishers.

⁶ J. de Castro, *The Geography of Hunger* (Boston: Little, Brown and Co., 1952). He presumably means undernourished as well as subjectively hungry.

economy, or of improving upon nature's natural selection, as has been done in the case of animal and plant breeding. One of the most interesting, if puzzling, facts is the high negative correlation between fecundity, nationally speaking, and the daily consumption of animal protein. Table VI, taken from De Castro, shows this relationship.⁷

TABLE VI
RELATIONSHIP BETWEEN BIRTH RATE AND
DAILY CONSUMPTION OF ANIMAL PROTEINS

<i>Country</i>	<i>Birth Rate</i>	<i>Proteins in Grams</i>
Formosa	45.6	4.7
Malay States	39.7	7.5
India	33.0	8.7
Japan	27.0	9.7
Yugoslavia	25.9	11.2
Greece	23.5	15.2
Italy	23.4	15.2
Bulgaria	22.2	16.8
Germany	20.0	37.3
Ireland	19.1	46.7
Denmark	18.3	59.1
Australia	18.0	59.9
United States	17.9	61.4
Sweden	15.0	62.6

The history of life is marked by the rise and fall of animal forms. The number of genera and species living today is only a small fraction of those which have arisen and disappeared or changed so completely as to constitute new forms. Of the mammals living today, the opossum has had the longest continuous existence in essentially its present form—140 million years. The oyster can lay claim to 200 million years, and lingula, a small shellfish, to 400 million. Probably no other living forms, except certain protozoa, can boast of such a history, nor can but few of the extinct forms. "Such ability to survive is exceptional. The vast majority of all the multitudes of minor sorts of organisms that have appeared in the history of life have either changed to forms

⁷ *Ibid.*, p. 72, Quoted by courtesy of the publishers.

distinctly different or have disappeared absolutely, without descendants.”⁸

The higher, at least the more recent, forms appear to come and go more quickly. Simpson relates that the mammalian land carnivores that have become extinct survived for something like 8 million years, on the average. Some survived for 20 million years, while others disappeared almost immediately. Extinct pelecypods (a class of mollusks) generally lasted on the average about 80 million years.

Simpson thinks the idea of “struggle” for survival has been much overdone. In fact, he appears not to care for the term at all. Certainly it should be understood to mean more than violent combat between two members of a species for a mate, or between members of the same or different species for available food or shelter. It may include these, but in relation to the total adaptive force in evolution it is relatively inconsequential. The idea of adaptation may come closer to what is meant. Survival counts in evolution because it is a condition to reproduction. Variations that enable organisms to get ahead in reproduction are the important ones. Variations that make better and wider adaptations to climatic conditions, that make better use of available food, that lead to living in herds for mutual protection, to hibernating, to maintaining a constant body temperature, to taking better care of the young, to migrating, to building better nests, to developing better immunity to disease—these are the kind of thing meant by “the survival of the fittest.”

The Evolution of Behavior

The only surviving records of animal life of the past are fossil remains of bones and teeth, as these are found in rock strata, caverns, or gravel beds. We can only infer behavior from structure. We infer that Java Man, *Pithecanthropus*, walked upright from his human-shaped structure, and this is true of other finds, and of

⁸ G. G. Simpson, *The Meaning of Evolution* (New Haven: Yale University Press, 1949), p. 196.

the more-than-ape, less-than-human species in Africa. The upright posture and the firm step, as opposed to the shuffling gait of apes, forever freed the hands from use in locomotion. From charcoal and artifacts of various kinds we can infer that extinct species of homonids used tools. We cannot determine, or even closely guess, the intelligence of these extinct creatures. We can determine that the cranial capacity of some fossil men fell within the normal range for man; that the Java Man's was nearly midway between this and the apes'. We do know that thought is required for the shaping of tools.

Animals must behave in such a way as to stay alive, reproduce, and rear their young. Admittedly, it might be difficult to catch some protozoa and other primitive forms at it. The main point in the skeletons the fossil remains of which we seize upon with such interest is that they made possible certain types of behavior. The opossum, whose skeleton has not changed appreciably during the last 140 million years, has survived by virtue of his behavior. To be sure, this may have changed somewhat down through successive periods of geological history, though there is no need to assume it has changed much. It has of necessity been adequate at all times.

Moreover, behavior, at least some behavior, is inbred. It is unlearned. It has come into existence and developed or changed as an integral part of the evolutionary system. It is as essential to the animal's survival as heart or lungs. The behavior of all animals except man is largely of the inbred or instinctive sort. This is the first great divide we encounter between man and the rest of the animal kingdom. Man's way of life is learned. This is not to say the division is complete, but it is nearly so.

There are three main divisions of innate behavior—reflexes, instincts, and emotion—found in animal life. Let us consider briefly the last two.

Instinct among animals. Instinct as a topic in psychology has lost favor within the last thirty years or so. One reason for this is its lack of explanatory value. The finding that a given act is in-

instinctive does not explain the act; but it does help to explain the animal. The term "instinct" apparently came into psychology by way of philosophy and biology. It was given its present formulation by Charles Darwin about the middle of the last century. While the term has been used widely both in popular and in scientific writings, and has therefore acquired several meanings, it is generally used today in scientific writing to designate the more complex innate patterns of behavior. The term "reflex" is reserved for the simpler innate patterns. Some well-known examples of the latter are sucking, swallowing, respiration, dilation and contraction of the iris, and glandular secretions. The term "instinct" is reserved for the more complex patterns, such as nest building, migration, mating, rearing of young, and food getting. The term "behavior pattern" is employed for the purpose of distinguishing instincts from other types of inheritance—such as color of the eyes, anatomical characteristics, and the various innate drives or propensities.

Up to the beginning of the nineteenth century scholars had apparently taken little interest in the question of human instinct. In fact, the dictum that animals are guided by instinct, man by reason, had stood as one of the classical distinctions between animal and man. Darwinian evolution, which assigned to man an advanced position among the animals, did much to draw attention to the kinship between man and animal. As a consequence of these teachings, men came to look upon the presence of human instincts as a distinct possibility.

The eloquent writing of William James, toward the close of the last century, had much to do with the popular acceptance of a belief in human instincts. He insisted that man, far from having no instincts at all, surpasses the lower animals in the range and the functions of instinctive equipment.⁹ The tendency to attribute instincts to man and to employ them in explaining human behavior was not seriously questioned until about 1920.

⁹ W. James, *The Principles of Psychology* (New York: 2 vols., Henry Holt and Co., 1890), Vol. 2.

During the last three decades, the instinct concept has lost favor among psychologists, while the importance of instincts in animal life is generally recognized. It is rather difficult to determine what all the factors are that have been responsible for the shift in opinion as to human instincts. Doubtless one is the work of the child psychologists. About 1920, psychologists began to employ the genetic method of studying child behavior—a method that had proved to be serviceable with animals. While it must be said that this method was not employed upon a scale sufficiently extensive to disprove the existence of human instincts, yet the scope of the work was sufficient to demonstrate that instincts are not the most obvious facts of child development. One of the outcomes of these early investigations was a critical revaluation of the sources of human behavior.

It is significant also that at about the same time the cultural hypothesis of human nature was prospering at the hands of sociologists and anthropologists (see Chapter IV). This concept, serving as it does as a significant hypothesis of the development of human nature, tended to eliminate the necessity of an instinct hypothesis. Of course, so long as the belief was entertained that man was created outright on a certain day in 4006 B.C. no problem of explaining human nature presented itself. But with the acceptance of the doctrine of evolution such an explanation became an urgent matter.

Two important principles are discernible in the evolution of animal phyla: group adaptability and individual adaptability. Inasmuch as instinctive modes of behavior are found in practically all the members of a given species, they can be looked upon as instances of group adaptation to environmental needs. On the other hand, those patterns of behavior which are acquired as acts of learning within the lifetime of the individual are instances of individual adaptation. Naturally, those species which change least during their life history are most dependent upon their original nature and are least capable of learning, whereas those which have the greatest learning ability are least dependent upon original nature. About fifty years ago, Lloyd Morgan called atten-

tion to this inverse relation between the instinctive equipment of the species and their learning ability.¹⁰

Field studies show that the most striking examples of instinctive behavior are found in the lower forms of animal life, such as the insects, the fishes, and the birds. It is also known that the requisite nervous mechanisms for learning are poorly developed in these species. Those animals which possess the more highly developed brains, and which consequently are capable of the greater learning, display less precision and nicety in their instinctive patterns.

While the brain stem remains remarkably stable as to its general function throughout the vertebrate orders, it is increasingly dominant as the cerebral hemispheres grow in size and function. We thus have at hand a neurological explanation of the fact that those species which are most capable of making individual adaptations are least capable of instinctive behavior. Thus we should expect man, who occupies the advanced position in cerebral development and the consequent capacity for individual adaptation, to be relatively free of biologically determined ways of acting. Man's evolution has not been in the direction of instinct, but in the direction of increasing capacity for learning—individual adaptability.

As a single illustration, let us consider some aspects of the instinctive behavior of migratory fowl. It is a well-known fact that many species of birds migrate from north to south and back again over distances that may amount to several thousand miles. The Arctic tern, one of the most celebrated migrants, covers in a round trip approximately 22,000 miles.

Aside from the general question of how migration came to be established in the various species, two problems are of particular concern: the conditions that set birds off and those by which they find their way. As solutions of the first, shortage of food in the breeding grounds of the North, owing to the approach of winter, falling temperature, changes in barometric pressure, and the like have been proposed. One fact alone makes untenable all of these

¹⁰ L. Morgan, *An Introduction to Comparative Psychology* (2d ed. rev., London: Walter Scott Publishing Co., 1903).

proposals; to wit, the constancy of the date of departure, year by year, for a given species.

A premature cold wave or an abortive snowstorm does not initiate a flight. There is likewise nothing constant in the availability of food. Actually, most species leave the North far in advance of winter, a fact which also eliminates shortage of food as a factor. Moreover, barometric pressure is in no wise seasonal in character. The only known relevant factor that seems sufficiently constant to account for the regularity in time of departure for the different species, year in and year out, is the length of the day, or the amount of daylight. Rowan's observations tend to link migration with the condition of the sex glands, which is in turn governed indirectly by the length of the day and directly by the amount of exercise the birds get.¹¹

It has been suggested that migrants *learn* the particular routes followed year after year. Although this proposal is not lacking in plausibility, in view of the fact that on an average they live to make five or six round trips, several facts stand against it. Some species typically fly only by night. It is not uncommon for the old birds and the birds of the year to leave at different times, following either the same or different routes. The cowbirds, which do not build nests of their own but lay eggs in the nests of about thirty different species, see their young for the first time in their winter home. The young migrate neither with their true parents nor with their foster parents.

One of the most striking examples is found in the golden plover, which nests on the shores of the Arctic Ocean. In the latter part of the summer the old birds forgather on the coast of Nova Scotia and from there set out across the Atlantic and put in on the coast of Brazil. From there they proceed to the Argentine. Some time after the departure of the old birds the birds of the year come down across the continent, and following this land route to Central and South America, join their parents in the Argentine.

¹¹ W. Rowan, *The Riddle of Migration* (Baltimore: Williams and Wilkins Co., 1931).

Aquatic migrants, of whom there are many, have no opportunity to learn their route.

In these examples we see some of the important characteristics of one level of behavior. By the nature of the case, learning is ruled out. Likewise, purpose or intent or other factors that are subsumed under intelligence are excluded. Here is revealed a mode of adaptation to an end—group adaptation—that requires neither teaching nor learning. Consider this matter in contrast to individual adaptation. In the latter, inheritance supplies a capacity in the form of cerebral tissue, but the use of this unassigned tissue is left to the experience of the individual members of the species.

Emotion in man and animal. Historically, emotion has been treated as conscious states, as behavior, and as both. In parallel with the history of psychology, the conscious aspects of emotion received major emphasis up to about forty years ago. As behaviorism and the objective methods of psychology prospered, especially as they were applied to animal and child study, interest began to center in the behavioral aspects of emotion. The relationship assumed to exist between the conscious and the behavioral aspects of emotion is extremely difficult to trace historically. At least since 1884, the role of the visceral and the vasomotor systems in emotion has been recognized.

Subsequent to the advent of behaviorism and to the launching of the experimental work in the field of emotion, largely upon animal and infant subjects, emotion came to be looked upon by several writers as *consisting of* organic changes, not as a result, an antecedent, or a concomitant. Thus Watson defines emotion as a "hereditary 'pattern-reaction' involving profound changes of the bodily mechanism as a whole, but particularly of the visceral and glandular systems."¹² This is the definition that will be used here.

¹² See W. B. Cannon, *Bodily Changes in Pain, Hunger, Fear and Rage* (New York: D. Appleton-Century Co., 1929). Also H. M. Gardiner, C. Metcalf, and J. G. Beebe-Center, *Feeling and Emotion* (New York: American Book Co., 1937).

While in human behavior we are often interested in the outward manifestations of emotion, here it is better to confine the discussion largely to a description of the internal or implicit reactions. These are the reactions that have great adaptive value for man and animal. For the present, let us simply note that in animal life outward or overt reactions to emotion-producing crises are instinctive, and that man's reactions are learned in accordance with cultural patterns, except in moments of complete disorganization, such as may sometimes happen in combat. In man, outward emotional reactions are learned insofar as they are patterned and adaptive. In the infant and the completely disorganized adult, they are diffuse and unadaptive.

From the standpoint of internal or implicit behavior, emotion features profound changes in the organism, especially those in the visceral, circulatory, respiratory, glandular, and skeletal-muscle systems. Digestive activities stop. There occurs a relaxation of tonus in the visceral muscles and inhibition of the salivary and pancreatic glands. Similarly, emotion is characterized by heightened tonicity of the skeletal muscles; by increased outpourings of certain glands, notably the liver and the adrenal and sweat glands; by an increase in heart rate, blood pressure, and respiration.

Not only is there acceleration in heart rate and augmentation in blood pressure, but there is accomplished also a transference of blood from the alimentary tract to the skeletal muscles and the central nervous system. One of the most interesting aspects of emotion is adrenal secretion. This fluid reinforces the entire emotional pattern in that it exerts the same effect upon the organs involved as does innervation of the sympathetic division of the autonomic nervous system. For example, stimulation of the splanchnic nerves, causing adrenal secretion, or injection of adrenalin, accelerates the heart and activates the liver, causing the latter to pour forth large quantities of blood sugar. Adrenalin also promotes the coagulation of the blood, and allays the effects of fatigue. The effect of adrenalin is also manifested in the tendency to tremble. In addition to these glandular involvements, in

emotion there is increased activity of the sweat glands. There is also the phenomenon of contraction in the capillaries of the skin, tending to cause the hairs to stand on end and to produce an experience of cold chills along the spine, and the dilation of the irises.

(1) *Unity of pattern.* Authorities have emphasized the unitary character of the implicit pattern. That is to say, the pattern is brought into play as a unit, either by excitation from the sympathetic division of the autonomic nervous system or by the direct action of the adrenal secretion. The pattern seems to be uniform with respect to *kind* in all emotional situations, although it doubtless varies in degree from one occasion to another, depending upon the severity of the exciting situation.

(2) *Universality of pattern.* Not only is the implicit pattern uniform in character as it is called out within the same individual from occasion to occasion, but it is also uniform from species to species. In fact, the pattern appears to be constant for all classes of vertebrate life. The implicit emotional reactions of a cat, for example, are essentially the same as those of a man.

(3) *The autonomic nervous system.* The implicit pattern of emotion is under the control of the autonomic nervous system. This system consists of three principal divisions: cranial, sympathetic, and sacral. Most of the internal organs are connected with the sympathetic division and one of the other two divisions; and the sympathetic division works in antagonism to the other two. It arouses the pattern that is referred to as the implicit emotional reaction. This division operates somewhat as a nerve net, a fact that dictates the uniformity of pattern and precludes differential action of the various organs involved in the pattern as the emotional situation varies.

The cranial division is said to promote the building up and conservation of tissues; the sympathetic division, the quick mobilization and expenditure of energy; the sacral supplies the necessary nervous action for "emptying," as in elimination of bodily wastes and in reproduction. For example, the cranial division constricts the irises, relaxes the skeletal muscles, increases

the tone of the visceral muscles, activates the glands the fluids of which are involved in digestion, and retards the heart. On the other hand the sympathetic division dilates the irises, increases the tone of the skeletal muscles, relaxes the visceral muscles, inhibits the flow of digestive fluids, and accelerates the heart.

(4) *Nervous center.* The nervous center for the implicit emotional pattern is the thalamus rather than the cerebral hemispheres. That the cerebral hemispheres do not serve as the neural center is shown by the fact that the pattern is not eliminated by the various types of injury or tumorous growth to which they are subject; and that decerebration in animals does not disrupt the pattern. In fact brain injury and decerebration are known actually to lead to intensification of the emotional reactions. On the other hand, elimination by surgical means of crucial portions of the thalamus results in complete abolition of these reactions.

In 1887 Bekhterev, as is related by Cannon, reasoned that the neurological center must be subcortical for the following reasons: (1) Emotion cannot be effectively inhibited by voluntary effort; (2) it may be evoked immediately after birth in the human infant; that is, before cortical dominance becomes effectively established; and (3) it is not abolished by decortication of animals.¹³

(5) *Biological utility.* The implicit pattern reaction promotes a speedy marshaling of bodily resources to the end that the organism is enabled the more effectively to meet sudden emergencies or crises in its career. These reactions are induced automatically by

¹³ Cannon, *op. cit.*, Chap. XIX. Subsequently Cannon and his colleagues isolated the particular portion of the thalamus that performs this office. In human subjects, Cannon relates, support of this conclusion is at hand from two sources, pharmacological and pathological. In ether anesthesia the cortical processes are abolished first. In this stage emotional responses persist, although the patient is unaware of them. Deeper anesthesia does abolish the emotional reactions. Upon the pathological side, it is observed in cases of hemiplegia that although the muscles of the paralyzed side of the face cannot be moved voluntarily, this side of the face may respond to emotional stimulation. On the other hand, instances are known in which one side of the face remains motionless in emotional excitement but can be moved readily by voluntary effort. In such instances lesions have been discovered in the thalamus.

the inciting stimuli which, following Bentley's usage, may be called "the emotional predicament." They are in no wise dependent upon volition. It is a part of nature's economy that many of the bodily functions, those which are most vital to the well-being of the organism, are performed automatically, without training and without intention. Such reactions are very old biologically and very stable. "It has long been recognized that the most characteristic feature of reflexes is their 'purposive' nature, or their utility, either in preserving the welfare of the organism or in safeguarding it against injury."¹⁴

During the countless millennia before man attained the plane of civilized living, the predicaments or crises that provoked strong emotion called for supreme muscular exertion. The same condition prevails today in wild animal life. Cannon cites evidence of the utility of increased liberation of blood sugar in the sustained muscular activity required for meeting emergencies. It is known that glycogen is stored up in muscles and that it is depleted in exercised muscles. Depletion of glycogen or reduction in the sugar of the blood lessens the ability of muscles to do work. Emotion is biologically very old and the physiological pattern in civilized man is probably identical with that of Java Man and Peking Man who roamed the plains of Asia a half-million years ago. It is in the light of this consideration that the biological utility of emotion should be reckoned. This consideration gives meaning to the various bodily changes under consideration. The utility of increased respiration and heart action in supplying oxygen and combustive material and in discharging carbon dioxide and in heightened tonicity of the skeletal muscles is likewise indicated.

(6) *Sources of energy.* Nor is emotion without utility to the men of today. The astounding energy that may be displayed and the extraordinary endurance that may be exhibited during periods of great emotional excitement have long been a subject of admiration. The literature pertaining to the exploits of the gladiatorial arena and the battlefield, and to the supreme endurance of the frenzied participants in the ceremonial dance or the antagonists

¹⁴ *Ibid.*, p. 194.

in the "battle of wager," abounds in feats of strength and endurance that, amazing though they be, seem plausible and verifiable from experience. In his excellent paper "The Energies of Men," James writes that "as a rule men habitually use only a small part of the powers which they actually possess and which they might use under appropriate conditions."¹⁵

Elsewhere James comments upon the "reserves of energy" that are rarely called upon but which may be tapped, as it were, by those who energize at a deep level. In his somewhat typical moralistic vein he writes, "More of us continue living unnecessarily near our surface." Or, "In rough terms we may say that a man who energizes below his normal maximum fails by just so much to profit by his chance at life; and that a nation filled with such men is inferior to a nation run at higher pressure."¹⁶

Our chief concern at the present is in the magnificent heights to which an individual can drive himself if the tide of emotion runs sufficiently strong. The exploits of John Colter as cited by Cannon emphasize the heights that human exertion and endurance can attain when individuals are induced to extend themselves to the utmost. Colter and his companion, while traveling in Montana in the early days, were taken captive by a band of Indians. Colter was stripped of his clothing; his companion, who resisted, was killed and hacked to pieces. Colter was then made the subject of a sporting event. He was induced to set out across the prairie. Looking back, he saw the young warriors preparing for the chase. Now he knew that he was to run a race for his life. He launched forth on the business at hand "with the speed of the wind." The war whoop arose; and a large company of young warriors armed with spears followed in rapid pursuit. "He ran with all the speed that nature, excited to the utmost, could give; fear and hope lent a supernatural vigor to his limbs, and the rapidity of his flight astonished him." After running some three miles his strength began to fail him. Stopping and looking backward, he

¹⁵ W. James, *Memories and Studies* (New York: Longmans, Green and Co., 1911), p. 287.

¹⁶ Cannon, *op. cit.*, pp. 233-34.

observed that only one of his pursuers was near. The latter rushed upon him, attempted to cast his spear, and fell. Colter seized the spear and with the help of this instrument dispatched his adversary to the happy hunting ground and set out again "With renewed strength, feeling, as he said . . . as if he had not run a mile."¹⁷

In religious manias that have sometimes swept a country, in tribal ceremonial, and sometimes in religious revivals, we find wonderful exhibitions of strength and endurance. Men and women dance and sing with all their might for hours on end, frequently reaching a frenzy nothing short of madness. Some of the participants swoon or go into writhing contortions, or gnash at objects with their teeth. In revivals in Southern highlands the author has seen women shout and dance with astounding fury, and end the maniacal performance in a swoon which left them pale and faint. Wesley writes of some of the meetings he addressed that "Some were torn with a kind of convulsive motion in every part of their bodies, and that so violently that often some four or five persons could not hold one of them."¹⁸

At our more normal levels of performance, after a moderate outlay, mental fatigue is adequate to reduce output or to inhibit further activity altogether. Under normal conditions of motivation the disagreeable character of fatigue serves to protect the tissues and to prevent extreme exhaustion. Under the impelling forces of supreme motivation, such as that which activated John Colter, the inhibiting influence of mental fatigue is nullified, as it is under the excitement of the ceremonial dance.

(7) *The question of depressing emotion.* The foregoing discussion of emotion and the inferences as to its biological function apply to the exciting emotions or, as they are sometimes styled, the great emotions—fear, rage, and sex emotion. There is another type of behavior in which persons are profoundly *moved*, but not excited; namely, sorrow and grief. Not a great deal is known about these depressing emotions organically, owing partially, per-

¹⁷ *Ibid.*, p. 227.

¹⁸ *Ibid.*, p. 233.

haps, to the fact that they are not present in animals or in infants, the two sources of most of our knowledge of emotion.

It is reported that pulse rate and blood pressure are depressed, and that breathing is slow and irregular. There is also a marked reduction in oxygen intake and CO₂ exhalation.¹⁹ It seems likely that in some of its most important aspects depressing emotion behaves physiologically in a manner opposite to exciting emotion, although not completely so, for loss of appetite and general disturbance of the digestive processes appear to be common to both.

Innate motivation. Plants are rooted down in the soil in such a way that they must absorb food and water when they are available. If the supply in the vicinity of the plant fails, the plant perishes. The dawn of animal life required the introduction of a new principle—freedom of action. This freedom required some further principle that would urge animals to seek out the sustenances of life. This office is performed by some of the well-known senses of the body, notably thirst and hunger. No animal could know how much water and food its body needs, when it needs them, or whether it needs them. These senses, sometimes referred to as *drives*, *urges*, or *propensities*, represent nature's methods of maintaining an appropriate water supply and a proper nutritional condition.

Likewise, other senses, such as those of pain and cold and warmth, are indispensable protective devices for animals. The propagation of animal species requires initiative—a function served by the reproductive urges.

Man possesses the same innate propensities that animals do, and they serve the same function in human life that they do in animal life. There is no evidence that man possesses any innate tendencies that are not also common to animals, that are human but not animal. Neither is there need of postulating the existence of any innate tendencies peculiar to man. There is overwhelming evidence that man acquires most readily tendencies and dispositions to act. In fact, acquired tendencies may often supersede

¹⁹ G. Dumas, *Nouveau traité de psychologie* (2 vols., Paris: Felix, Alcon, 1932), Vol. 2, pp. 383 ff.

innate ones. Thousands of people are known to mutilate their bodies and to incur unspeakable torture in order to produce so-called beauty scars. Fasting for religious purposes is common to man. People have been known to starve rather than eat tabooed foods; and human sacrifice is common to various cultures. Every generation of modern times has witnessed countless thousands of men submitting to the hardships of the battlefield or freely offering their lives in defense of a *cause*.

The Lord of Creation

Six thousand years, 60 centuries, 600 decades, 85 consecutive lifetimes of threescore and ten, take us back beyond the period of civilization. If you are twenty-five years old you have lived $1/240$ of this time. You have lived $1/80$ of the period signified by the letters A.D. This is not much time in comparison with the expanses we have been talking about, nor is the period of the known history of man. Naturally we are curious about the fate of old *Homo*. Since there has been nothing like him in geological history, no one can make an intelligent guess. For the first time in history the earth harbors a being who is capable theoretically of destroying all forms of life. Admittedly, ants or bacteria or a few other forms might give him a bit of trouble. What chance has our noble and venerable opossum against a gun! Especially in the hands of a creature who kills for fun, as well as for food! Especially one who acts as if everything that exists, exists for his benefit and pleasure, or indeed was "put here" for that purpose.

To repeat, no one knows how long he will trouble the world. But at least we know that the world certainly troubles him. The patient oak and the shifting sands have claimed more than one civilization. Thought, guilt, conscience, ego—they are wonderful, but also fearful, things. Among all living things they are the property and burden only of man. With thought goes freedom of action; with freedom go conscience and guilt. With all three (plus other things) goes ego, with a host of attendant problems that no other animal knows. In addition to guilt, there are failure, cruelty,

grief, strife, hate, love, and death—consciously known to no other animal. These have no meaning except for thought and freedom. In man, the fight for life, self-preservation, has vastly extended meaning. In addition to physical life and well-being there is the life and well-being of the ego.

Guilt is what we do to one another day by day in the fight for life. The individual kills in order to live. But there is more than killing. Theft, envy, calumny, indifference are guilt. . . . Can I call the lion guilty that slays its prey? The lion would not be a lion if it did not kill. It cannot do otherwise. . . . But between lion and man runs the divide of freedom. The lion has the innocence of nature. Objectively, all nature is in the state which, in man, turns to guilt, but subjectively, nature is not guilty. Man is no longer bound to his instinctive actions. He has insight. The possibility of choice is before him. The man who treats his fellow as the lion treats its prey can do otherwise, and therefore he is guilty.²⁰

This, as Weizsäcker suggests, is the meaning of the Adam and Eve story in the Book of Genesis, which stands as one of the great allegories in the annals of all literature.

We have considered the biological need of food. In human life, psychology talks about the need to express aggression—a concept to be discussed more fully later. A person may cultivate and harbor as a friend another person whom he can dominate and even abuse to a degree. If we had it catalogued and set down, we might find that there is more aggressive behavior within the institution of marriage than almost anywhere else. This is above and beyond purposeful and conscious maliciousness.

We must face the possibility that everywhere in civilized life there exists the need to do others harm. We read in history that the Romans were a bit hard on the early Christians, and that later Christians dealt with the heretics in a manner that must have been as wonderful to behold as it is sad to contemplate. Throughout recorded history, slavery has been an accepted institution until very recent times, although it disappeared from most of the rest of

²⁰ Weizsäcker, *op. cit.*, p. 184-85. Quoted by courtesy of the publishers.

the world at an earlier date than in the United States. Moham-medans dislike Christians, Christians dislike Jews. Race prejudice is widespread, and is particularly violent in parts of the United States and in the Union of South Africa. "Man's inhumanity to man" is so universal as to suggest the possibility that it is more than mere human frailty. It is thinkable that in some unconscious way it may fill a human need. The fact that people also like to do good to the unfortunate is no certain proof to the contrary. Mr. Pecksniff's observation that "it is always satisfactory to feel, in keen weather, that many other people are not so warm as you are" is more than the meanness of a villain. It has in it some of the elements of a universal truth. Of course there are love and goodness in man also, else hate and evil would have no meaning.

There is in the world today, particularly in the United States, a new institution—the operation of high-powered automobiles. With this we have killed more people than we have lost in all the wars in which ever we have been engaged. This must be attributed to something more than the urgency to get to some other place in a hurry. Can we think of this as a kind of American roulette? There must be 50 million regular listeners to American radio. Perhaps there are something like a million confirmed alcoholics in the United States alone, and several times that many heavy drinkers.

From poppy to curare, from Andean coca to Indian hemp and Siberian agaric, every plant or bush or fungus capable, when ingested, of stupefying or exciting or evoking visions has long since been discovered and systematically employed. The fact is strangely significant; for it seems to prove that, always and everywhere, human beings have felt the radical inadequacy of their personal existence, the misery of being their insulated selves and not something else, something wider, something in Wordsworthian phrase, 'far more deeply interfused.' ”²¹

Man's freedom from the bonds of instinct is both his strength and his danger. He can rise above inborn patterns of behavior. But when he does so, his actions have no longer the assurance of inborn behavior. . . .

²¹ A. Huxley, *The Devils of Loudun* (New York: Harper and Brothers, 1952), p. 314. Quoted by courtesy of the publishers.

A certain stability exists in man's early, mythical stage, when the rule of deep-grown traditions keeps from the individual's arbitrary fence the areas left open by inborn patterns. The actual break-through into intellectual self-reliance and rational civilizations, however, is a revolution. Through it man enters an essentially unstable phase, and so far there is not a sign of a new stability toward which the transformation might be tending.²²

Now let us face it! In the whole world of knowledge scholars everywhere are searching for naturalistic explanations. Nowhere does one encounter nonphysical, extraphysical explanations of anything. On the other hand, one who has much acquaintance with the world of scholarship is also aware of the fact that religion, near-religion, quasi-religion, protoreligion, or something of the sort is a universal characteristic of mankind.

Indeed this is one of the classical distinctions between man and animal. Here is part of our dilemma. Man is of nature, yet he has in a sense torn himself loose from nature. He is the only creature that has the slightest knowledge of nature. He alone has knowledge of anything. It is precisely this knowledge that makes the hard facts of life difficult. There is mystery; there is inquiry, born of knowledge. But there is not only the need to know—a need stemming from human intellect—there is, growing out of knowledge of life and death, a need to be something other than mere nature, something more than animals and plants, which live and die also. There is a need to transcend the observable facts of life. Man is certainly a part of nature. But the fact that he has some knowledge of nature places upon him the need to be something more than a part of nature. Once he becomes enthralled, as he must, with a consciousness of self as a free, powerful, and independent entity in nature, it becomes almost a necessity for him to think of himself as something more than nature, as something permanent and enduring. Suppose man ultimately convinces himself that he is nothing more special than a fancy kind of physical nature—can he live with such a notion? Remember that up to 6000

²² Weizsäcker, *op. cit.*, pp. 165-66. Quoted by courtesy of the publishers.

years ago—6000 out of 600 million, man was one of the least important beings in the world.

One final suggestion—old *Homo* is quite as capable of irrational action as of rational action. He is given to strong feeling and violent emotion. Only the scholar among us is capable of following rational thinking in a completely impartial way to a logical conclusion, and he can do so only when faced with the more or less impersonal issues of his own discipline. His reflections in the face of race problems, party politics, or religious questions are not appreciably different from those of the rest of us. On momentous issues men equally well informed and equally intelligent can arrive at diametrically opposite conclusions and take diametrically opposite courses of action. Man cannot be relied upon to follow a rational course of action where his feelings are implicated. Perhaps one could not find a social issue of consequence that would divide the intelligent and educated from the unintelligent and uneducated. Man is capable of forsaking self-interest insofar as this has meaning in the animal world in general. Man alone is capable of this. Man would not be a man if he could not do this; just as Weizsäcker's lion would not be a lion if he did not always follow immediate self-interest.

Out of the Past

Man can be distinguished from animals in many ways. Any trait that man possesses as a universal characteristic and which no animals possess, at least in a natural state, may be useful for this purpose; as well as any traits that animals possess which are not shared by man. We already know that animals live by inborn, biologically acquired behavior. Men everywhere live by culturally acquired, individually learned behavior. This is very nearly a universal distinction. So also is man's upright walk, and his articulate language, and his use of tools. At least for all practical purposes these traits may be regarded as universal distinctions. There doubtless are others. These are probably the basic ones. In studying the history of human evolution S. L. Washburn came to

the conclusion that man's upright posture came first—or rather the changes in foot, pelvic structure, and spine that made this possible. The brain, which made possible language, and subsequently inventions and use of tools, cultural transmission, came later, he thinks. Shoulders and trunk have not changed but are those of the ape.²³

We have seen that man's physical features have developed through evolutionary processes during the last 600 million or so years, if we include mammals, reptiles, and so on back into the sea. Man's instincts, if any, and his emotions are animal. As a concomitant feature of the evolution of his brain he has lost or almost lost his instincts. His innate drives and propensities are also those of animals.

Out of his upright posture and his unspecialized brain have come tools, language, thought, a whole set of new drives and interests—all that we associate with civilized man. Man is a cultural being. Human nature is shaped by culture and for practical purposes is derived by culture. Men learn, mostly from others, and teach. This is the basis of our cultural heritage, which is treated in the next chapter. Here also we see how man is shaped by the past, but with one remarkable difference—his own past thought, action, and feeling.

This is a revolution. It is not only a revolution in the sense that nothing like it has ever existed in nature before, but also it is a revolution in the sense that it represents a completely new type of heritage, which Simpson styles "the new evolution."

Organic evolution rejects acquired characters in inheritance. . . . The new evolution peculiar to man operates directly by the inheritance of acquired characters, of knowledge and learned activities which arise in and are continuously a part of an organismic-environmental system, that of social organization. Organic inheritance is limited in its spread in space and in time by its rigid requirements of proximity and of continuity. Learning inheritance was similarly limited in its earlier stages, and it still is in all the lower animals, not subject to the new evolution;

²³ Ruth Moore, "Evolution Up to Date," *Harper's Magazine*, November 1953, pp. 86-87.

but in modern man it has escaped these limitations. Means have been devised for recording and transmitting knowledge external to the organism, by graphic methods, at first, and now also by recordings of several other types and by wire and wireless transmission. In the new evolution we can inherit directly from ancestors dead two thousand years or from ancestors younger, perhaps, than we are and half the world away from us or from our organic kin. Our inheritance can be passed on, instantaneously or after a lapse of untold generations, to our whole species and without any necessary course of gradual spread in the population—a potentiality seldom or never now fully realized and yet surely inherent in the new heredity.²⁴

This is truly a remarkable phenomenon. Man alone teaches what he learns. He alone thinks. He alone uses symbols with which to communicate with others as well as with himself. He alone says anything or has anything to say. These things are the proud possession of men everywhere! Yet there is nothing like them at all to be found anywhere else in the whole animal world, now or in the past. Their rudimentary counterparts are not to be found in man's past; but sound and voice, brains, hands, and all the bodily mechanisms upon which they depend are found in the past and are out of the past, just as are foot, pelvis, skull.

Ethical Man

No account of human nature would be complete without some reference to moral man. Like truth and falsity, right and wrong have no meaning except to creatures who have language. Man is fundamentally a moral being. This is not to suggest that the first man was turned out fully equipped, or equipped at all, with a ready-made sense of right and wrong, or even that these concepts had any meaning for him. On the contrary, we may suppose that ethical standards have evolved from man's social experiences. A naturalistic approach to human nature demands that this position be taken. So does the fact that moral values are relative to the culture in which people live, and the fact that they are dictated

²⁴ Simpson, *op. cit.*, p. 287. Quoted by permission of the publishers.

by the exigencies of life. For an extreme example, if the rigors of life demands that the size of a population be kept down in order to serve at all, the people may be permitted to kill a certain number of girl babies and men to share wives. In fact these practices may be looked upon as moral duties. We should not have to go far back into our own history to find forms of behavior that were then regarded as perfectly ethical that would land one in jail today. If an example is required, consider the churches' ownership of slaves. Morality is a changing, developing sort of thing. It is also a dynamic thing.

Beyond normative ethics. One hears a good deal of criticism of normative ethics these days. Whether or not normative ethics is anything more than a straw man the writer does not know. Naturalistic ethics is certainly not the same thing as normative ethics. Ethics is something more than a statistical matter, although it probably embraces statistics. If a man ate well himself but fed his children the scraps from his table, that would become an ethical issue. But if only ten or a hundred people regarded this as wrong we could hardly so view it. It would not be immoral for a man to feed table scraps to his dog. Nor would it become a moral issue if he first fed his dog and ate the scraps himself, although hardly anyone would think this proper behavior. Thus while morality is related to the number of people holding a particular view, the fact of something's becoming a moral issue is not dictated solely by numbers. There are many issues on which we could get a high percentage of agreement that do not relate to morality at all—wrap-around winshields, for example.

What makes an issue a moral one? Obviously, one of the factors is how people *feel* about it. How do people come to feel the way they do about right and wrong? Partly because the behavior in question has or has had important consequences in social experience. But this is not enough. Right behavior is clothed with a host of symbols that have emotional value: in primitive culture, with unending ceremonial usages and taboos; in civilized cultures, with ceremony, authoritative personages, song literature, church serv-

ices, mass media communication, and so on almost without end. In a sense, moral issues grow out of social usage and are sustained and nourished by all the kinds of reinforcement the people have at their command. The Old and New Testaments, our best account of man's contention with the forces of life, may or may not have had such an origin. That is scarcely an issue here. We must account for the ethics of people everywhere, three-quarters of whom do not live by Christian ethics.

Some have thought that if we really understood the fundamental nature of man we would know how he ought to act in all societies. The point of view adopted in this book is that man is largely a product of his life in society. It is suggested that there is no essential man apart from society, at least none that would tell us what ethical values he should have. If we try to picture a generalized man, we can think of intellect, passion, upright posture, manual dexterity, and (already mentioned) guilt and suffering.

Freud originally posited two kinds of instincts: the ego instincts and the sexual instincts. The former are the impulses toward preservation of self, including the superego—the moralities, for example. The individual struggles against any behavior or situation that threatens the ego's existence. The libido or sexual instinct signifies a great deal more than the adult meaning of "sex." It is, according to Freud, the pleasure-striving force in life.

One is tempted to draw a parallel between Freud's conceptualization of life and Milton's account of the struggle between Jehovah and Satan. To most of us, "sex" is an ugly word, but so is "Satan." And the pleasure principle, like Milton's Satanic Majesty, has scarcely come off second best in man's struggle.

ADDITIONAL REFERENCES

- Fromm, E., *Man for Himself*. (New York: Rinehart and Co., 1947)
Leuba, G., *The Natural Man, as Inferred Mainly from Field Studies of Men and Chimpanzees*. (Garden City: Doubleday and Co., 1954)

Mullahy, P., *Oedipus, Myth and Complex*. (New York: Hermitage Press, 1948)

Pfeiffer, J., *The Human Brain*. (New York: Harper and Brothers, 1955)

Simpson, G. G., *Life of the Past*. (New Haven: Yale University Press, 1954)

IV

RACE AND CULTURE

BIOLOGICALLY, race is of relatively little importance. In the light of anything we now know about race, we must say that of itself it is one of the lesser facts about people. To be sure, formerly it may have had some adaptive significance. Between $23\frac{1}{2}^{\circ}$ North and South latitude a dark-skinned person probably could withstand the sun's rays better than could a light-skinned person; he could withstand better the ultraviolet rays of the tropics, and would have a better cooling mechanism. Clothing and shelter have reduced the importance of skin color. Some think it never did have a great deal.

In most of the countries of the world today, skin color has no biological value of consequence. Race is important only because of people's attitudes toward it. The fact that the Jews are not a race at all does not in any way lessen the violence of prejudice against the "Jewish race." Race is important because man's culture has made it so. But even so, it is one of the most persistent and troublesome sociological facts of our time.

What is Race?

The man on the street is scarcely bothered with the question of what race is, except for his tendency to make it embrace too much. Specifically, he may not distinguish between definitions of race that have ethnological significance and those which do not.

An example of the latter is the failure to recognize that the distinction between Aryan and Semitic peoples—or, as it is usually worded, Aryan and Semitic races—has no ethnological significance at all. Aryans are simply people whose remote ancestors spoke an Aryan (Indo-European) language. The Semitic “race” is a group of people whose remote ancestors spoke a Semitic language—Arabic, Hebraic, Syrian, and so on. Both groups belong to the same race, ethnologically speaking.

When it comes to the common ethnological groups we call “races,” the man on the street has no trouble at all. He immediately recognizes this person as a Negro, this one as a Caucasian, and that one as a Mongolian. The fact that some white persons may be darker than some Negroes or Mongolians does not ordinarily trouble him. He may supplement his impressions of skin color with other sense impressions—hair texture, eye fold, or facial features. The fact that sometimes neither he nor the most competent specialist can tell the “race” at all does not shake his confidence in his knowledge of what race each belongs to. When he is uncertain, or when he makes a mistake, which may be often enough, he may dismiss it with the observation that it does not matter to him anyway. If it does matter, in the case of doubt he has a fairly practical mode of procedure or at least he is aware of such a procedure; namely, to investigate the person’s ancestry.

In fact, one of the regrettable things about this problem is that the common man can classify people racially so readily. This is one of the chief sources of concern to education, psychology, and even cultural anthropology. We could well wish the problem much more difficult. On the other hand, the physical anthropologist is concerned about just the opposite state of affairs. He complains about the absence of any infallible criteria. Actually, he has been unable to improve very much on the methods of the man on the street. No wonder he is dissatisfied! This is not to disparage his ability or his industry. More important, it suggests the possibility that there are no race differences except those which are readily observable to the eye.

Race is what we choose to call it. We speak of races of crown

rust in oats, races of fruit flies, races of people. In all cases we have in mind significant subgroups of a species that have certain distinguishing characteristics of a biological character—that are transmissible by descent. Only those characteristics which an organism inherits and mutations in his own genes are transmitted to its issue. Learned traits, such as languages, may of course be transmitted culturally by teaching and learning, but they are not transmitted biologically. As a matter of fact we apply the word “race” only to those characteristics which are of some importance to us. Originally, human race was important historically. It is still so, but now its historical importance (except to scholars) is a minor matter in comparison with its social importance.

Anthropologists, because of their dissatisfaction with different existing methods of race differentiation, have been searching for more reliable criteria. Usually this has meant a search for a more reliable way of classifying people into existing racial groups. But some have taken the position that skin, hair, and facial characteristics are not good grounds for race differentiation and have either proposed others or maintained that we should have others. This is not put forward as merely a more reliable means of sorting people into groups called Caucasian, Negro, and Mongolian. It is proposed to constitute races on some other grounds. For example, Boyd in his excellent book has proposed blood type as such a basis; not blood type as a means of sorting out whites and Negroes, but for purposes of establishing races O, A, B, and AB, or others as they may be determined.¹

Boyd's proposal does have the advantages he claims for it. Blood type can be readily determined; it is not ambiguous—people belong to one type or another—and it is transmissible by descent. Even so, this and other like proposals are rather curious, to say the least. If they are put forward as a means of lessening race conflict, we could well wish their adoption. But we cannot even get rid of the silent letters in English words, about which there may be some prejudice but one which in comparison with race is, to

¹ W. C. Boyd, *Genetics and the Races of Man* (Boston: Little, Brown and Co., 1953).

say the least, mild. Except for the purposes of blood transfusion, or possibly some other kind of medical service, no one except a specialist cares much about blood type. At least no one's interest goes beyond the academic level.

Naturally, it would be foolish for an educational psychologist to say that such proposals may not have great significance for physical anthropology. If by some means not now conceivable such a plan were generally adopted, physical anthropology might benefit, but we still would have white people, Negroes and Mongolians, and other minor groups. They are what all the fuss is about anyway. We would still wonder how the differences among them came to be. We would still have conflict between them, and all its problems. Of course there might be some ameliorative effect in the knowledge that science no longer recognized these peoples as belonging to different races. Blood type, for example, cuts across existing racial lines. In fact, we do not know of any racial differences of any kind in blood.

The purpose of these last statements is simply to point up the difference between the problem of race in physical anthropology and the problem in education and psychology. What matters to us are attitudes and behavior toward people of different race. Even so, in order to deal with race problems we need to know something about the physical facts of race and the sources of race prejudice.

Race and Geography

We do not know the origin of the various races. But we do know that they lived apart from each other for a very long time. We do not require much knowledge of racial history to come to that conclusion. Everywhere races interbreed, especially when not separated by psychological and social barriers. It may be assumed that geographical separation has been essential to the preservation of the differentiating features of race. Civilization has broken many of the barriers. Boats, fire, houses, clothing, agriculture, have made it possible for peoples of the world to mingle with

each other. Geographical barriers still exist; but there are other barriers which man has raised himself. Economic ones prevent free movement. There are national barriers and immigration laws, legal barriers, as well as psychological and social ones. Man-made barriers are temporary and subject to change. It would take a rash person to predict that races may not some day disappear. Most of the more stringent man-made barriers have existed for something like two hundred years.

It is possible that geographical conditions not only maintained the races by keeping them apart from one another, but also gave rise to their differentiating features. Everywhere among living things, in the sea as on the land, we see the influence of geography, not simply barriers, but also climate—temperature, rainfall, sunlight, food. These are the conditions to which living things must adapt. If selective adaptation is one of the driving forces in evolution, we would expect different conditions to lead to different forms of life. Conditions in the sea are different from those on land, so much so that only a few creatures can live in both milieux. The desert requires peculiar adaptations. There are high altitudes, the frozen North, the tropics, dense forests and vast plains. There are factors of chemistry and ecology, and so on. Everywhere we find selective adaptation.

If racial characteristics have adaptive significance—that is, if they are not accidental—we should surmise that they are the result of varying geographical conditions. Boyd says: “There is little doubt that there is a direct relation between the intensity of the ultraviolet radiation and the intensity of pigmentation.” He quotes L. W. Lyde as saying:

If pigment is developed according to need . . . we should expect to find the “blackest” skins amongst men . . . in the hottest parts of the world that are unforested; and this is precisely what we do find—the real black man coming (except for a few small groups, e.g., on the edge of the Australian desert) essentially from the African savana. The rich black of the Western Sudan, with its high percentage of bright sunshine to leeward of monsoon jungle, is not found inside the jungle or on islands with typically marine climates. For instance, the *negrilloes* of the

equatorial forest in Africa, like the Sakai in the Malay jungle, are yellowish; the Samangs, like most of the Australians, are dark chocolate; the Nilotic negroes are reddish; the Indonesians are almost tawny.²

It is not difficult, however, to find anthropologists who doubt that race represents selective adaptation in any way.

Boyd points out that "the influence of environment on animals is so well known that it has been formulated in a number of rules." Only one, Gloger's rule, concerns us directly here. It is to the effect that melanin (dark pigmentation) is most pronounced in warm, humid regions; that the phaeomelanins (reddish or yellow-brown) predominate in arid regions, shading into whites in the Arctic. For the animal world at least, the latter phenomenon may involve, in addition to direct selective adaptation to climatic conditions (if it does so), selective adaptation to color of the snow.

Again following Boyd, once geographical barriers become effective they keep out new genes developed in the same species in different regions. Needless to say, genes of one group can be introduced into another group only by breeding. Once a population is isolated, the way is open for it to develop along special lines, because gene mutations are kept within that population. Here there would appear to be some advantage in smallness of population, as when a larger population might be divided by some sudden geographical change. Moreover, the isolating effects of barriers serve to lessen competition and reduce the force of selective pressure, and permit a group to go its own way, more or less. One of our best examples of this is found in Australia. Until introduced by man, there were only two or three minor groups of placental mammals. All the rest were marsupials. Our fine old opossum notwithstanding, marsupials are regarded as a low, primitive type of mammal, older and more primitive than placental mammals: "...they are animals which veer back toward the varied and vanished mammal-like reptiles."³ As if freed from competition with the more advanced and aggressive placental

² *Op. cit.*, p. 178.

³ W. Howells, *Mankind So Far* (Garden City: Doubleday and Co., 1944), p. 40.

mammals, these marsupials radiating out aboveground, underground, and in the air filled numerous ecological niches. Boyd also suggests that the dwarf forms sometimes found on islands and occasionally on other isolated areas may represent selective adaptation to scarcity of food.⁴

Races of Men

Who, then, do we mean by *homo sapiens*? To begin with, all living men. All equally, moreover, and none more than any other. It should be borne in mind that it is no more typical of the species to be white of skin than to be black, for a white horse is not more of a horse than a black one.⁵

Here we are not concerned so much with those differences by virtue of which races were established in the first place as with the question of whether or not there are other concomitant differences—those which are independent of our definition of Caucasian, Negro, and so on. One such question has already been mentioned—blood type. Others are body build, cranial capacity, hairiness of the body, and of course the larger question of differences in gene structure, which we are not able to get at very well, at least directly.

This hardly seems a fitting place to present detailed results of investigations on race differences. As Howell asserts, “between the skin and the skeleton all men are almost indistinguishably alike.”⁶ As he also says, all the differentiating characteristics of our species—upright walk, erect head, straight bones, large cranial capacity, thin skull, and the rest—which differentiate *Homo sapiens* from other species, are possessed in common by all races of our species. The reader interested in examining the evidence is referred to Klineberg’s book on the subject.⁷

⁴ *Op. cit.*, Chap. VI.

⁵ Howell, *op. cit.*, p. 183. Quoted by courtesy of the publishers.

⁶ *Ibid.*, p. 218.

⁷ O. Klineberg, *Race Differences* (New York: Harper and Brothers, 1935).

Besides a few genes for skin color, he [Glass] thinks that there may be a dominant gene for kinky hair and a pair or two of genes for facial features. He considers it unlikely that there are *more than six pairs of genes* in which the white race differs *characteristically* from the black. This estimate errs somewhat on the small side, in the opinion of the present writer. Probably, however, it is of the right order of magnitude.⁸

All this takes on additional meaning when it is remembered that within both the white race and the Negro race individual members may differ from each other by many times this number of genes.

The Brotherhood of Man

The recorded history of man is a history of culture conflict centering in caste, class, race, religion, nationality. Boyd cites Lord Bryce as authority that there has never been anywhere at any time much feeling of race consciousness up to about the time of the French Revolution. But everywhere today there is a proclivity to hatred. Hitler had his Jews; McCarthy, his Communists. Such leaders do not create hatred, beyond fanning it a bit. They take advantage of feelings that are there in men's thoughts and revealed in their actions. Apparently at no time has religious hatred been incompatible with religious zeal and practice. Religious strife has a much longer and more violent, if no more honorable, history than race conflict. Various writers have expressed the belief that the American slave trade did a great deal to crystallize racial consciousness and racial feeling, as men began to take sides. Christian men, at least men living in a Christian world, could not harmonize the enslavement of brothers with Christian teaching. Hence it became convenient to believe that the enslaved were different and an inferior people.

Inasmuch as we are more or less acquainted with our own history, we may easily get the impression that the white Christian

⁸ Boyd, *op. cit.*, p. 200. Quoted by courtesy of the publishers.

has been more assiduous than others in abusing his fellows. This may be true to an extent, since he has practiced cruelty longer and over a wider area than the other groups. It must be observed, however, that while it is not to our credit to say so, there are others quite as bad as we are, even though we exclude Cortés, De Soto,⁹ and Pizarro.⁹

We have deplored the part Portuguese, British, and Dutch shipping interests played in the slave trade of the recent and regrettable past. But who, besides African tribesmen and tribal chieftains, caught, manacled, and delivered to the loading pens the victims of slave traffic! One has read with certain feelings of shame the record of the white man's treatment of the Indian in America. As regrettable as this was, if we except Cortés and his like it was pale compared with the cruelty that strong Indian tribes and nations practiced upon the weaker ones. One is tempted to observe that the one essential ingredient in human cruelty is power and the means of exercising it.

Race Conflict. In racial attitudes, as in other matters, the individual accepts the prevailing social standards as right and natural. So completely are the prevailing attitudes toward the Negro, for example, justified and assimilated with other social and moral standards that the caste system may be maintained effectively without there being actual consciousness of race prejudice. Many persons who do not permit the use of the front door by Negroes can, and do, honestly assert they feel no antipathy toward the members of that race, with the reservation, "so long as they keep in their place." Psychologically, this reservation is the heart of the problem, because the Negro's "place" is held to be one below white people. The Negro's place is one of service to the white man: material service as he bears the white man's burdens, and spiritual service as he does him obeisance. As Gallagher points out, the benevolent paternalism that many white families exercise with respect to Negroes, especially their own tenants and servants,

⁹ R. Wright, *Black Power* (New York: Harper and Brothers, 1954); B. DeVoto, *The Journals of Lewis and Clark* (Boston: Houghton Mifflin Co., 1953).

is an expression of race prejudice; and it is more effective in maintaining the caste system than is overt antagonism, although it is certainly more humane and stems from better motives.¹⁰

The position of the "inferior races" is particularly onerous owing to the fact that the members are identifiable by the color of their skin and the texture of their hair. Members of "inferior" nationality and religion can, in many instances, escape detection by changing their names and adopting the culture patterns of the dominant or "superior" groups; and they can actually become a member of such groups. Even if the Negro succeeds in working his way upward economically, socially, and educationally, and adopts the language and the customs of the dominant group, he is still denied status in that group. He is still subject to the rules of etiquette that are so effective in maintaining the caste system. There still prevails, as Gallagher points out, the axiom that "any white man is better than every Negro" and that any person with any amount of "Negro blood" is inferior to every white person.

Authorities, notably Toynbee¹¹ and MacCrone¹² aver that during medieval times the man of the Western world recognized chiefly two classes of people, Christian and non-Christian or heathen. It may be that race prejudice as such came into being partially as a historical accident—that the Christians of the Western world were white and the non-Christians of the rest of the world were prevailing of different color. These barbarians were fit subjects for slavery and exploitation not because of their color or race but because they were non-Christians, as is seen by the fact that it was unlawful, by Christian ethics, to hold in bondage a baptized person. In that era, the white men of Western civilization laid claim to superiority on account of religion and civilization, not on account of race. However, religious fervor being what it was, it was inevitable, psychologically, that color would come

¹⁰ B. G. Gallagher, *American Caste and the Negro College* (New York: Columbia University Press, 1938).

¹¹ A. J. Toynbee, *A Study of History* (London: Oxford University Press, 1934).

¹² I. D. MacCrone, *Race Attitudes in South Africa* (London: Oxford University Press, 1937).

to be a sign of inferior human status when missionaries learned that those non-Christian barbarians did not take well to Christianity. Thus "Christian" came to be associated with white man, or simply "European," and "non-Christian," with skin color.

However, other factors intruded. Clashes between white settlers and natives were common. Owing to the insecurity of frontier life, conflict with the natives constituted an ever present threat to the white settlers' security and was a potent factor in fomenting race hatred. And, to be sure, our own history and literature from colonial times down to the present have served to perpetuate and enhance the concepts of superiority and special rights and privileges of the white man. Thus race attitudes have never been primarily racial in an ethnological sense, although they are none the less real for that.

If racial antipathies were really racial in origin, they would be aroused in proportion to the closeness of physical proximity. We know that when members of a minority race are in close proximity in some menial capacity, serving our table, caring for our children, feelings of hostility are not aroused. The situation is very different if they break the barriers of social distance. In former days it was a fine and never-to-be-too-much-imitated event for a white woman in certain sections to take along her Negro maid when on a journey by train. How different the feeling had the selfsame maid taken it upon herself to purchase a ticket, board the train, and take her seat in the same compartment! Physical distance is the same; social distance has changed.

The Jew. A similar cultural history stands back of present-day prejudices against the Jews and other minority groups; and, like the so-called racial prejudices, conflict between majority and minority groups—for example, between Jew and Gentile—stems from a multiplicity of causes. But among racial groups economic and religious conflicts loom large. Perhaps nowhere is man's treatment of man seen in a worse light than in majority reaction toward the adherents of the Jewish faith. The pogroms, the ghettos, and the enforced wearing of badges of identification are too well known to make necessary their recounting here. Jews were once

forbidden to own slaves, Christian and pagan alike, or to employ Christian labor of any kind, or to engage the services of a Christian midwife.

Discrimination against the Jews is all the more irrational because they were never outside Western culture as were the barbarians who became the victims of oppression and discrimination. They have ever moved westward with the tide of culture. They were not interlopers in European civilization. Golding asserts that of all the peoples of Europe today the Jew has the longest and most continuous history of settlement, and was certainly identified with European culture long before several of the present nationalities had made their appearance in Europe. From the year 1000 A.D., he says, "the greater and more vital part of Jewry was definitely settled in Europe, and henceforth associated preponderantly with European life, European ideas, and European intolerance."¹³

Again pointing up the irrationality of hatred of the Jews is the fact that there are relatively speaking hardly any Jews in the whole world. There are perhaps 11 million, about half of whom reside in the United States. They make a well-marked target. Perhaps 11 million out of 2 billion! In the case of individual adjustment, psychology has a principle that persons who cannot accept themselves find it hard to accept others. This is a part of what we mean when we say that everywhere people need to express aggression, need a scapegoat, need to blame and even to hate. We have many frustrations. Often there is a great gulf between reality and the ideal. It is more comfortable to hate others than it is to hate ourselves.

Generally, everywhere the Jew has gone he went as an immigrant, not as a colonist. This makes a lot of difference. For example, this explains why American life is British, not Italian, German, Swedish, Polish, and so on. Colonists transplant their culture—language, household gods, a way of life—on new soil. Immigrants adopt what they find. American life is British, not-

¹³ L. Golding, *The Jewish Problem* (West Drayton, Middlesex, England: Penguin Books, Ltd., 1938).

withstanding the fact that nearly half of the people living in the United States have sprung from immigrant forebears.

Thus the Jew has only asked to retain the one thing that makes him a Jew, his religion. In his case, this involves the preservation of his ancient ceremonial language, his religious practices, and a particular type of family life. If we grant their right to existence as Jews, we must grant them this privilege, even the right to be clanish and exclusive about it. One becomes a Jew by birthright. Everywhere Christian religious bodies are out trying to win converts. The loss of adherents is not too serious, because there is always the expectation of recruiting others. Jews do not practice this; membership is a birthright. Only Christians, and possibly Mohammedans, among the larger bodies, send out missionaries.

Fairchild points out another difficulty. The Jewish people have some of the characteristics of a nation—but one without a country.¹⁴ The Italian or Swedish immigrant can completely adopt the American way of life without destroying Italy or Sweden. His country, the land, the people, and all the symbols, are still there and intact. He can point to them. They remain objects of his loyalty and devotion. Not so with the Jewish immigrant. He must maintain Jewry, his ancient and venerable institution, in America, in Europe, in Asia, or wherever he goes. Otherwise the institution and its symbols disappear.

This fact also differentiates the Jews from racial groups. The Negro, for example, can completely adopt American culture, as he has—he may well be thought of as an unwilling immigrant—without in any way destroying the physical reality of his race. Incidentally, social forces in America have not led to the fostering of racial pride on the part of the Negro. In a hotel in Oklahoma City one can find (at least recently one could) perhaps a hundred pictures of Indian braves, maidens, and chiefs. All of these present the American Indian in a favorable light. Even in literature and in history he is generally pictured as a worthy adversary. The billing he has had in the motion-picture industry is questionable,

¹⁴ H. P. Fairchild, *Race and Nationality* (New York: Ronald Press Co., 1947).

as is the treatment he has received at the hands of the Department of the Interior. In contrast, the Negro has had shabby treatment in art and literature, and on stage and screen.

The role of the school. It seems safe to say that our schools do not actively teach race and culture conflict. It is certainly not among our educational objectives. But no matter how careful we may be not to teach it, directly or indirectly, it exists in the informal social life of our schools. Moreover, it seems to increase from grade to grade. Radke and Sutherland, who investigated this problem in grades 5 to 12 found a decreasing tendency from grade to grade for pupils to endorse favorable statements about Negroes and Jews and an increasing tendency to endorse unfavorable and hostile statements.¹⁵ The authors felt that the changes in attitude of these pupils reflected the impact of home life and of the general culture to which they were exposed. There were no Negro or Jewish pupils attending the schools investigated.

Granting that schools do not actively teach race prejudice, or other forms of prejudice, the fact that such prejudice increases during the school years (at least there is some evidence that they do) and that everywhere out of school this is a pervasive sociological phenomenon, forces us to conclude that we teachers have not been effective in ameliorating the conditions.

To the latter purpose two or three suggestions are offered. First, it is proposed that we teach in school, and to a point that is effective, the best information we have about race phenomena, about the Jew, and about others as required; that we do so objectively and as completely as we can, subject to the developmental level of the pupils.

First, in this connection we should teach the difference between characteristics of races that are racial and those which are the result of social circumstances. For two thousand years the white man has been dominant. He was the first to invent guns and to develop the technical knowledge that enabled him to impose his

¹⁵ Radke and Sutherland, "Children's Concepts and Attitudes About Minority and Majority American Groups," *Journal of Educational Psychology*, 40 (1949), 449-68.

will upon others. This is not a very long time as racial history goes. There is little to suggest that it will be the same two thousand or two hundred years hence. Generally speaking, the Negroes in America are a race of poor people. Is this a circumstance dictated by race, or by the fact that the white man rules that the colored man must accept unremunerative work? Negroes have a reputation for indolence. Can this be an adaptation to the frustrations he meets everywhere? In some sections of our cities heavily populated by Negroes there is found a high rate of crime. Is this a racial trait or a cultural circumstance? Is the crime rate in such zones higher than that among other races similarly housed, similarly fed, clothed, and employed? We should teach the difference between race and circumstance.

Second, we should teach, insofar as we understand and pupils can comprehend, the causes of hostility and the variety of ways in which hostility and prejudice are expressed. We are all familiar, at least to some extent, with the palpable and more violent forms of prejudice—discriminative legislation, housing covenants, disfranchisement, segregation in eating and travel, discrimination in employment, and so on. We should also teach some of the subtler ways of expressing, of teaching and perpetuating, racial prejudice and hostility. Think, for example, how many ribald stories, or stories that are simply funny, are race- or culture-typed, and how much the typing adds to the story, by way of making it easy to tell or adding to the point it makes. In popular speech the adjective "Scotch," as in the expression "Mr. B is Scotch," conveys a well-known and uncomplimentary meaning. Regardless of what the history of this usage may be, we can be fairly certain that it is unknown to the common man, who incidentally is well acquainted with this meaning. It seems equally certain that this part of his education was supplied by stories he has heard and told about Scots. Jews are commonly reputed to go a little beyond simple penuriousness in business practice. Again, so far as the writer knows, there may or may not be a historical basis of fact for this reputation. For present purposes that is beside the point. If there be such a basis of fact, the common man is unaware of it.

He and others maintain the Jew's reputation in business by typed stories. Other sorts of stories involving the Jew are equally pejorative.

The fact that none of these typings may be true at all does not alter their educational power. In fact, most stories, except some of the witty kind circulated among intellectuals, are degrading to some extent to some class of people—mothers-in-law, old maids, hillbillies, and, in immigrant days, people of various national origin. Perhaps we may infer that they serve some kind of psychological need. Observe how in times of national distress and tension rumors circulate. One hears that Catholics, Jews, and Negroes also have a never-ending supply of stories about Protestants, Gentiles, and white people. Possibly it is somewhat like Pecksniff's observation, already quoted, that "it is gratifying in keen weather to reflect that others are not so warm as you are"—or at least not any warmer.

One simply does not hear typed stories that are complimentary. The Negro in ribald stories is obtuse, incongruent, given to stealing chickens, has practically no sex morals at all, and so on. To repeat, we should teach and study all the ways in which hostilities are expressed toward different groups of people. It might help somewhat just to know what we are doing. This procedure is also basic to another purpose spoken of in the next suggestion.

Third, there might be some virtue in an idealistic approach. Perhaps a reformation could be started among students as effectively as anywhere. It might help if we could develop a sensitivity to race and culture conflict; if we could get the rights and feelings of others on our consciences. In our vast and prosperous land there should be room for a good life for all. On the positive side we might try emphasizing the virtues of minority groups—for example, the high-minded, religious temperament of the Negro, the almost unparalleled family life of the Jew.

Perhaps a word should be added about religious tolerance. Most Protestants are tolerant enough toward the standard branches of the Protestant religion, and even toward the Roman Catholic faith, with perhaps some reservation about the possi-

bility of improving the lot of persons already or even long since departed. But Protestants and Catholics alike may think the "stool house" or the living sacrifice of the African Gold Coast or the Jew's refusal to admit the divinity of Christ "positively scandalous." The adherents of every faith feel, and must feel if their religion is to have any force, that theirs is the "true religion" or pretty close to it. No one is going around believing in things he thinks are not true. If it is admitted that a person has a right to his faith, it must be admitted that he has a right to feel that his is the true faith.

But religious tolerance has some boundaries. Articles of faith and forms of worship are one thing; political and social activities that church bodies sometimes engage in are another thing. We should not be accused of intolerance when we criticize or legislate against secular practices of church bodies. Of course it is sometimes difficult to draw the line between articles of faith and secular matters. Over this issue a given church body need not and should not have sovereignty when the practices of a church affect society in general. Indeed great power is always to be feared, whether it be the power of churches, of government, or of industrialists. Power breeds arrogance, no matter by whom it is exercised, as history well shows. These things we have a right to discuss openly in school, except where we are stopped by this very power.

The Stamp of Culture

The remainder of this chapter will take a look at Simpson's "new evolution" (Chapter III). Naturally, we cannot take a very extensive look. Offered here are a few examples of the kind of influence the cultural heritage exerts on mankind.

We are human because we can talk; civilized when we can write; and scientific when we have a sound method of isolating problems, seeking facts, inventing explanations, and testing these objectively.—E. Faris, *The Nature of Human Nature* (New York: McGraw-Hill Book Co., 1937).

Man since the earliest paleolithic times has lived by his culture; and his nature in turn has been shaped by the character of the culture he has wrought. It is the thesis here that the fact of becoming human is conditioned in large measure upon being reared in a human environment, and that the kind of human being a person becomes is contingent upon the kind of human environment in which he is reared, with due allowances made for individual differences in potentiality. Man develops cultural products—language, tools, religion, and varied institutions—to meet his needs. These are adaptations to ends, just as projection, rationalization, and fantasy are adaptations to personal problems; and like the latter these adaptations when made contribute to the making of the man.

The concept of culture. Those who have forgotten their freshman sociology are reminded that the term “culture” is used by anthropologists and other students of social behavior to designate various sorts of creations of man that are handed down from generation to generation. These creations consist of all the channeled ways of social interaction: ways of meeting strangers, addressing servants, procuring a wife, going to war, acquiring property, entertaining guests, maintaining a family, or behaving at religious functions. They also consist of tools or implements of varied use and application. We study the history of man, reckon the time at which his civilization began, and gauge his level of attainment from era to era in terms of his tools.

Culture consists in all of the customs, attitudes, knowledge, language, and implements of people that are handed down and taught the young. Even among the most primitive tribes the young are taught the way of life of the group. In a fast-moving social order such as our own, innovations are comparatively frequent. The culture of primitive peoples is much more stable; individual members can exercise much less freedom in making adaptations to environment.

It is difficult to exhaust the customs and small ceremonial usages of savage people. Custom regulates the whole of man's action—his bath-

ing, washing, cutting his hair, eating, drinking, and fasting. From his cradle to his grave he is a slave of ancient usage.¹⁶

Malinowski tells us, however, that there are certain spheres in primitive life where individual adaptation is permitted and even rewarded.¹⁷ It is in the long list of ceremonial usages that little deviation is tolerated.

The behavior patterns of a people reflect the cumulative experiences of those who have lived before them. Unquestionably the origin of the great majority of the cultural patterns of every type of civilization is lost in antiquity.¹⁸ Faris poses the question: Who can explain why in one cultural pattern a man owes his first allegiance to his wife rather than to his parents, while in another his parents take precedence over the wife?¹⁹

Group priority. Social psychologies written a generation or so ago prevailingly took as their point of departure man's original nature, his instincts and inborn tendencies, and proceeded to an explanation of his customs, traditions, institutions, and the whole of his civilization in terms of this original nature. The nature of the social order, with its good points and its bad points, was said to be what it is because man's original nature is what it is. Many social ills were partially excused on the ground that man has in his original nature a certain amount of the perverse. A few years later the opposite point of view began to take hold. Whereas the original view had held human nature to be prior to the nature of the social order, the revised view holds that the nature of the social order is prior to the nature of human nature. As Professor Dewey has so aptly said, our institutions cause our "instincts," not instincts our institutions.

Each individual, by the time he reaches adulthood, is able to acquire the fundamental elements of the intellectual, moral, reli-

¹⁶ From W. G. Sumner, *Folkways* (Boston: Ginn and Co., 1906), p. 28. Quoted by courtesy of the publishers.

¹⁷ B. Malinowski, *Crime and Custom in Savage Society* (New York: Harcourt, Brace and Co., 1926).

¹⁸ S. Winston, *Culture and Human Behavior* (New York: Ronald Press Co., 1933), Chap. IV.

¹⁹ Faris, *op. cit.*, Chap. XIX.

gious, social, economic, and mechanical culture of his race, elements that have been centuries in the making. *In the acquisition of these cultural elements, human nature takes form.* If the cultural elements to which the individual is subjected from birth to maturity consists of magic, superstition, tribal custom, taboos, totem poles, and wooden spears, the result is a savage.

The facts gathered from the study of man in all forms of society, from the most primitive to the most modern, argue that an individual's nature is determined by the prior nature of the group into which he is born. Without the group transmission of cultural patterns the infant of today would have to begin in a cruder way by far than any of the primitive men of whom we have any record, even Java Man. "Without the priority that is represented in group transmission of civilization, the modern infant would be helpless before animal life of all forms, even those on insect levels. . . . He, or even the most mature of us, would not have a chance of surviving long before the engulfing primitive conditions that would be operating."²⁰

Anthropologists have repeatedly called attention to the vast differences in the character of people of different cultural groups, even though the groups are racially and linguistically similar. As Benedict has said, cultural patterns are local and do not correlate with racial characteristics. Human nature seems to follow cultural patterns rather than racial ones. Moreover, the character and temperament of a group may change without the slightest evidence of corresponding changes in their biological constitution.²¹ The work of the anthropologist in delving into ancient ruins, in plying his trade in the remotest places of the world, and in learning the languages and customs of primitive people of today, has resulted in much more than lectures and lantern slides for public platforms, and thigh bones, totem poles, and loin girdles for museums. It has forced the realization that except for the culture that has

²⁰ E. S. Bogardus, "The Principle of Group Priority," *Journal of Applied Sociology*, 7 (1922), 84 ff.

²¹ R. Benedict, *Patterns of Culture* (Boston: Houghton Mifflin Co., 1934), pp. 233-34.

intervened between us and the savage, we should be savage; and except for the culture that intervenes between savage and animal, he would be an animal, and a very poor one at that.

The fact that slavery, witchcraft, dueling, polygamy, "healing," magic, infanticide, bride purchasing, scalp hunting, the seeing of visions, and the possessing of evil spirits have all been in the mores of peoples, ancient and modern, is common knowledge. If vision-seeing is in the mores, as for example among the Indians of the Great Plains, and is an accepted practice, vision-seeing is common. This phenomenon is rare among those tribes in which it is not condoned and expected as a natural experience.

Primitive man believes in magic and attempts to ward off impending doom by ritual because these are in the mores. As Sumner points out, the notion of right is in custom, not outside of it, or of independent origin. "In the folkways whatever is is right. This is because they are traditional and therefore contain in themselves the authority of the ancestral ghosts."²²

Another lesson gained from social psychology is that mores are continually undergoing change. Herein lies the explanation of changes in human nature that take place from generation to generation. Within the last two or three hundred years in Western civilization materialistic mores have gradually supplanted mystical ones. Most of us are scarcely aware that change is going on, yet even a superficial examination of the literature of a century or so ago forces the conclusion that such change has taken place.

Culture and thought. Not only would individuals, each in his own lifetime, be literally incapable of developing systems of writing, number, and spoken language, but such individual developments would be virtually worthless were they capable of such achievements. A system to be of any value from the standpoint of communication must be used in common by large groups of people. Moreover, a person's willingness to master these cultural products thus provided by social heritage is owing to social pressure. And even this is only the beginning of man's debt to his culture, for

²² Sumner, *op. cit.*, p. 28.

in adopting the forms of expression used by those about us, we are led to take up certain social forms of thought which ultimately control the whole mental life. . . .

If, for example, there is no word in a certain social environment for long spatial distances except a word which refers to a certain number of days' journey, it is not likely that the individual will feel any tendency to discriminate fifteen miles from seventeen. His attitude in this matter will be determined by the attitude of his social environment, and he will neglect in his thought, as do those about him, the finer details of distance. Similarly, if there are no names for certain forms of property rights, it is not likely that the individual will, of his own initiative, recognize these forms of right as belonging to those who constitute the social group with him. . . . The history of thought has been, in large measure, the history of the development of certain social ideas which could be marked with definite names and made subjects of thought, because they were so marked. Consider for a moment the difficulty which would be experienced in conducting any train of thought with regard to the forces of physical nature if there were no names for the different forces and no fully developed definitions to give each name clearly recognized character. If it is true . . . that general tendencies of thought have been dependent upon the development of words to express ideas, it is still more true in the case of the individual that his mental tendencies are very largely determined by the forms of social thought expressed in words.²³

Piaget makes the point that logic develops as the child's thoughts become socialized. The young child's thoughts are ego-centric; he assumes that others necessarily think as he does, says Piaget. This apparently comes about in part from the fact that the young child does not readily distinguish between words and ideas on the one hand, and the things they symbolize on the other. Through social interaction he learns that different opinions about things are possible, and that opinions may be wrong. From the same source he learns that it is possible to make empirical tests of opinions.²⁴

²³ C. H. Judd, *Psychology: General Introduction* (Boston: Ginn and Co., 1917), pp. 225-26. Quoted by courtesy of the publishers.

²⁴ J. Piaget, *Language and Thought of the Child* (London: Paul, 1926).

Thus there is reason to believe that man owes so intimate and personal an aspect of his nature as his own thought processes to his culture—not only the content but even the form of his thoughts. In a train of thought—which is mediated by addressing symbols to one's self—it is just as essential that the thinker get the meanings of the words and symbols as it is that an auditor get them in social conversation. As Mead points out, there are certain symbols or gestures that affect the individual as they affect other individuals, that arouse the same response in the individual as they do in others.

Here, then, we have a situation in which the individual may at least arouse responses in himself and reply to these responses, the condition being that they have an effect on the individual which is like that which they have on the other. That, for example, is what is implied in language; otherwise language as a significant symbol would disappear, since the individual would not get the meaning of that which he says.²⁵

Again, following Mead, a condition of language is that it *signify* and *indicate*, that the word or gesture or other sign be significant to the person who manufactures it and indicate something to another. This means that the symbol must have a meaning that is common to both persons; and in practice, a meaning that is common to the group. Language in an extremely limited sense could arise between two persons or among the members of a very limited group, like a family, and could function in a similarly limited manner in thought. But by virtue of cultural transmission an individual starts his intellectual life with standard symbols by the thousands at his disposal. The meaning of these his more mature fellows already know. Social example and social pressure so hasten their acquisition by the child that ere he attains his second birthday he has learned the meaning of a sufficient number of these standard symbols to afford a basis of thought.

The social genesis of thought. It is especially noteworthy that the individual converses with himself with the aid of exactly the

²⁵ G. H. Mead, *Mind, Self, and Society* (Chicago: University of Chicago Press, 1934), p. 145. Quoted by courtesy of the publishers.

same symbols as those with which he converses with others, and that he converses with others first. From this we may infer that the genesis of thought is social communication.

Thinking always implies a symbol which will call out the same response in another that it calls out in the thinker. Such a symbol is a universal form of discourse; it is universal in its character. We always assume that the symbol we use is one which will call out in the other person the same response, provided it is a part of his mechanism of conduct. A person who is saying something is saying to himself what he says to others; otherwise he does *not know* what he is talking about.²⁶

Words produce the same responses in the thinker that they do in others. But it is significant psychologically that they *produced these responses in others first*. They come to produce these responses—have these meanings—in the thinker by virtue of their effect upon the group.

The social genesis of inalienable rights. Thus the technique and the form of thought have a cultural origin. Moreover, from the same source we get our superstitions, customs, beliefs, aspirations, attitudes, and religion—both the fact and the form of religion—and also our rights and liberties. A first-culture man has a right to his wife, as is signified by the cord he ties about her loins—a kind of magical binding. He has this right, both as consciously appreciated and as an objective fact, because others recognize it. Moreover, he has the right to slay any other man who attempts to practice seduction. He has this right also because it is recognized by others. Polynesian parents have the right to practice infanticide, for the same reason. A person is incensed by the abrogation of those rights and liberties which his culture has taught him he possesses. His inalienable rights of which he talks with so much self-assurance turn out to be nothing more than those rights which have names and which other people have recognized. And the liberties for which men are alleged to have fought from the begin-

²⁶ *Ibid.*, p. 147. Quoted by courtesy of the publishers.

ning of recorded history change so much from era to era and culture to culture within an era as to suggest that they, too, are based upon social recognition. We also find that the causes of war are pretty largely formalized. Likewise, modesty with respect to parts of the body also has a cultural basis, in that it exists only in behalf of those parts of the body which are conventionally covered with clothing, and because they are so covered. Except for clothing, feelings of immodesty could not exist with respect to parts of the body.

The social genesis of abstract thought. "Language is a *catalogue raisonné* of the notions of all mankind."—Mill. Mueller makes the point that if within a language there is no name for father-in-law, the people who speak that language do not know what father-in-law is.²⁷ The character of the language of a people or of a tribe reveals the character of their thinking, and indeed shows us what the level of their mental development is at a given time. If the members of a tribe do not have an expression for "the eye," as opposed to "this eye" or "his eye"; or if they cannot form the expression "love" or "pity," as opposed to "his love" or "his pity for him"—to use examples employed by Boas—and if a like absence of terms denoting abstraction with respect to other general concepts is found, we may safely surmise there is everywhere present among those people the most rigid limitation in abstract thinking. For their then existing culture, limitation in language is causal to limitation in thinking. Without the necessary expressions abstract thinking cannot go on.

But in another sense, it may be equally true that were there any great desire for abstract thinking, the necessary forms of expression would emerge. Did the pattern of culture create the demand for abstract thinking, the people probably would find means of forming the concepts. Says Boas, the Indian will not speak of goodness or of the power of seeing in the abstract, apart from the goodness of a person or without designating an individual who

²⁷ F. M. Mueller, *The Science of Thought: Three Introductory Lectures* (Chicago: The Open Court Publishing Co., 1877), p. 48.

has the power of seeing.²⁸ One reason for his not doing so is the fact that his culture, including his language, does not make this demand upon him. The interrelationship between general culture, language, and thought can scarcely be overemphasized. They are mutually supporting. Each influences, and is influenced by, the other. "Language is generated by intellect and generates intellect."—Abelard.²⁹

Parental behavior. It has been said of Descartes, an able proponent of the existence of innate ideas, that his "innate ideas" were those of the century in which he lived. We have seen that man's "instincts" vary with the cultural pattern in which he lives. If there are any instances of immutable human behavior, of behavior that is alike in all cultures, we should expect to find them in man's reactions toward his children. Klineberg, who has compiled a good deal of information on the so-called parental instinct, collected from many cultural sources, is led to believe that this trait, so long regarded as fundamental and immutable, also varies with the cultural pattern of the group. For example, on the Murray Island in the Torres Strait adoption of children is so widespread that it is difficult to trace genealogies, the children taking the names of their foster parents. It is reported that on the Andaman Islands it is a rare occurrence to find children above the age of six or seven living with their own parents. Here it is considered a compliment for a married man upon taking leave of his hosts to ask to be allowed to adopt one of their children. In ancient China the concept of motherhood was divorced from every tie of blood. There was one principal wife, and therefore one principal mother. The children of the secondary wives were regarded as sons and daughters of the principal wife. She alone bore the title "mother" and received the homage due a mother, the blood mothers being regarded as aunts by all children alike. Rivers reports

²⁸ F. Boas, *The Mind of Primitive Man* (New York: The Macmillan Company, 1911), p. 150.

²⁹ Cited by Mueller, *op. cit.*

that among the Banks Islanders the child belonged to the man who made the necessary payment to the midwife."³⁰

Parents at various times and in various parts of the world have entertained widely varying attitudes toward their children. In some societies parents have exercised over them the right of life and death. The head of a Roman household destroyed his newly born if he did not wish to rear it. As a general rule, primitive peoples appear to treat their children much more kindly and sympathetically than do the highly civilized peoples of today, although there are notable exceptions. We find tribes who have practiced selling their children. For example, the Botocudos of South America willingly sold their children to the Brazilians. In the upper Congo they have been surrendered in the payment of debt. In other instances children have been sold as slaves; in others infanticide has been widespread.

Self-appreciation. The influence of prevailing cultural patterns upon the outward manifestations of human nature seems reasonably clear. It is also probable that man's appreciation of himself is of social origin to a considerable extent. It is suggested that his self-appreciation grows out of his ability to cope successfully with the physical forces in his environment and his interaction with his fellows.

Man's inventions in the character of implements and techniques for controlling the physical factors in his life must have made a tremendous contribution to his appreciation of his own prowess. What of that inventive genius who first fashioned a stone ax and lashed it to a handle? What a sense of security that crude implement must have given him! To him it meant protection and food. Now for the first time he could walk the forest as a man, lord of the beast. How the use of fire, or the invention of the fishhook, or that of the wheel, must have changed man's appreciation of himself!

As man has learned more down through the ages, he has taught more and learned more. Each new acquisition—the wheel,

³⁰ Klineberg, *Race Differences*, Chap. XIV.

the needle, the plow, the sail, the printing press, the steam engine, gunpowder, vaccines, and gods, to say nothing of ethical codes and rules of conduct—has added its bit to the very nature of man.

The self is something which has a development; it is not initially there, at birth, but arises in the process of social experience and activity, that is, develops in the given individual as a result of his relations to that process as a whole and to other individuals within the process.³¹

Man's social self arises out of social situations. Since the time of James, psychologists have emphasized the many-sided character of self. A man has a business or professional self, a club self, a church self, a parental self, and so on. It is noteworthy that his status may be very different in each group. What is important for our purpose is the fact that his appreciation of himself is causally dependent upon his estimated status in the various groups of which he is a member. Mead maintains that while it is possible to conceive of a solitary self once self-appreciation has arisen, it is impossible to conceive of a self's arising outside of social experience. To this end Faris states that consciousness of self

arises within a social situation as a result of the way in which one's actions and gestures are defined by the actions and gestures of others. . . . We become human to ourselves when we are met and answered, opposed and blamed, praised and encouraged.³²

Thus an individual evaluates himself by the reactions of others toward his behavior, or more particularly, by his evaluation of their reactions. Illustrative of which is Tolstoy's philosophizing about Napoleon: "He could not disavow his own acts, that were lauded by half the world, and so he was forced to disavow truth and goodness and everything human."

The self and the primary group. The primary group is, to follow Cooley, the nursery of human nature.³³

³¹ Mead, *op. cit.*, p. 135.

³² *Op. cit.*, p. 7. Quoted by courtesy of McGraw-Hill Book Co.

³³ C. H. Cooley, *Social Organization* (New York: Charles Scribner's Sons, 1909), Chap. III.

By primary groups is meant the family, the playground, the neighborhood, and other groups in which free play exists, and face-to-face social contacts are made. Such groups "are primary in several senses, but chiefly in that they are fundamental in forming the social nature and ideals of the individual."

Perhaps the playground stands as one of our best examples of education in a primary group. Because of its early influence and because of its co-operative and competitive character, it has an important socializing effect. Here the child's status in the group is determined, his responsibilities and limitations are defined. The emotions he awakens in his fellows, the regard in which he is held, the duties that are delegated to him, not only contribute to his social behavior but also influence his consciousness of self.³⁴

Some of the most effective teaching in the home is of this informal type. The teaching that parents do when they are not trying to teach at all is probably much more effective than their most carefully designed pedagogy. This kind of learning may be styled *interlearning*, learning one from another in face-to-face relationships, wherein there is neither intention to learn nor intention to instruct. Much of the learning that goes into personality development is of this kind.

The primary-group character of the school is not limited to the playground. Informal learning takes place wherever groups of pupils and teachers meet upon a free-play, give-and-take plane. Even the socialized recitation has some of these features.

The sectarian group affords a final illustration of primary group life. In his paper "The Sect and Sectarian" Faris likens the sect to a primitive tribe. Like the primitive tribe, the sect is characterized by certain patterns of culture peculiar to itself.³⁵ To be brought up as a tribesman is to take on the peculiarities of the tribe. To be brought up a Shaker is to acquire certain characteristics not shared by the Dunker or a nonsectarian.

Social isolation. Man's debt to culture may be seen on the negative side by observing some of the consequences of social isola-

³⁴ Cf. Mead, *op. cit.*, pp. 135-226.

³⁵ *Op. cit.*, Chap. V.

tion. The culturizing process is not primarily one of trickling down from above. It takes place most readily when there is a sense of free play among individuals. It is possible for groups to live in close physical proximity to one another and yet one group be influenced very little by the other, provided they are separated by certain social, economic, racial, or religious barriers. It is possible for certain families or groups of families to dwell within the confines of a larger cultural area, as in the case of a cultural island, without being influenced in any significant way by the prevailing cultural patterns of the larger group.

Thus various kinds of cultural isolation or exclusion are found. Some of the more common forms are as follows: (1) *spatial*, typified by geographic barriers such as oceans, mountains, and deserts; (2) *structural*, involving sensory defects or limitations in brain capacity, motor ability, health, or personal appearance; (3) *personal*, including those habits and characteristics which are unacceptable to the group; and (4) *psychic*, including racial barriers as well as political, national, social, and economic ones.³⁶ "Variations in language, folkways, mores, conventions, and ideals separate individuals and peoples from each other as widely as oceans and deserts."³⁷ Thus W. I. Thomas states that "by reason of poverty, geographical isolation [or] caste feeling . . . individuals, communities, and races may be excluded from some of the stimulation and copies that enter into a high grade of mind."³⁸

Within a heterogeneous framework such as our own, all kinds and degrees of cultural isolation or exclusion are found. There are subgroups, large and small, so isolated either by physical barriers, or by those of race, religion, or the economic caste system, that they are affected relatively little by the normal process of cultural change. To the extent that groups remain outside the

³⁶ R. E. Park and E. W. Burgess, *Introduction to the Science of Sociology* (Chicago: University of Chicago Press, 1921), pp. 229 ff.

³⁷ *Ibid.*

³⁸ W. I. Thomas, "Race Psychology: Standpoint and Questionnaire, with Particular Reference to the Immigrant and Negro," *American Journal of Sociology*, 17 (1912), 725-75.

range of social interaction they are relatively unaffected by changes in cultural patterns.

There is good warrant for the school's concern about the pupil's extracurricular activities—the teams, clubs, and societies to which he is admitted and the friendships he makes. The pupil who is excluded from the various phases of the social life of the school fails, by the extent of the exclusion, to profit fully from the advantages of school life. Theoretically all pupils have an equal chance to learn mathematics, English literature, or wood carving, but their chances of getting a fully rounded education are not equal by any means.

Constants in Social Organization

One frequently meets the observation that human nature never changes, or that it is the same the world over, or another statement to the same effect. Frequently such declarations are found fitting and quite descriptive, if nothing more is intended than some such generalization as that in every society there are those who will injure another's reputation, take his goods by foul means; or that everywhere there are signs of "weakness of the flesh." Actually there are relatively few known constants.

Certain American universities have leagued themselves together to form a colossal filing system on the characteristics of societies that have so far been studied in some detail. Currently data are available on some two or three hundred societies out of twenty-five hundred or so. Traits or characteristics, as coded, are punched on IBM cards and can be run through sorting machines as desired. This program gives promise of becoming a means of studying societies on a scale that until recent times would have been regarded as unbelievable. So far, few universal traits have turned up. Perhaps the incest taboo heads the list. Apparently no society has ever permitted incest except in isolated cases, such as among the ruling class in ancient Egypt. Also, people in all societies seem to maintain some kind of family type of unit, as opposed to a herd type, although the nature of the family structure

may vary considerably. For example, the father is by no means universal "head" of the household. All societies regulate sex practices. There has apparently never existed in any society for which data are available a "golden age" of liberty. Regulations are always encountered. A family type of organization is not exclusively a human trait. In some form it is found in many animal species.

Individuals and families seem to prefer social relationships with others. This is rather basic psychologically. One might almost say it is illustrated by an almost universal need to talk. At least a need to assert one's influence a little, to make one's presence felt, to appear favorably, to elicit response and recognition from others. The social aspects of *self* has already been discussed. Apparently *self* makes little headway in a solitary condition. If some wayfaring man brings to the campus in Iowa City a particularly witty or otherwise a particularly good story, the first to hear it can scarcely wait for a chance to relate it to another. This may do several different things for the teller. If there is any universal here, it may be the fact that the teller is more anxious than the listener. Regardless of whether man in society needs an audience or companions or whether part of the need of companions is the need of an audience, man has a tendency to maintain social relationships of some kind or other, and in accordance with some kind of rules.

One might be tempted to make a case for the practice of religion as a universal social phenomenon. However, this would probably involve us in a squabble about definitions. What to a man in one society may be called religion may to a man in another society look like rank superstition. One might come at the problem the other way round. It would be difficult to find a society in which some sort of belief in nonphysical or extraphysical force or phenomenon is not or has not been held, as evidenced by amulets, beads, charms, ikons, altars, sacred books, sacrifices, ritual dances, propitiation, prayer. Here, as in similar instances, the phenomenon itself is not so interesting psychologically as the question of how it came to be and why it is encountered in nearly all, if not all, societies, primitive or otherwise. Perhaps the matter should be allowed to rest there, and this chapter be ended with the observa-

tion that so far there appears to be little that we can set down as characteristic of man in all societies except those things which form a part of the definition of man—such as speech or walking erect.³⁹

ADDITIONAL REFERENCES

- Allport, G. W., *The Nature of Prejudice*. (Cambridge, Mass.: Addison-Wesley Publishing Co., 1954)
- Cook, L. and E., *Intergroup Education*. (New York: McGraw-Hill Book Co., 1954)
- Gillan, J., Editor, *For a Science of Social Man*. (New York: The Macmillan Company, 1954)
- Handlin, O., *Adventure in Freedom*. (New York: McGraw-Hill Book Co., 1954)
- Hayes, M. L., "Attitudes of High School Pupils toward Negro Problems," *Journal of Educational Research*, 46 (1953), 615-19
- Honigmann, J. J., *Culture and Personality*. (New York: Harper and Brothers, 1954)
- Klineberg, O., *Social Psychology*. (Rev. ed., New York: Henry Holt and Co., 1954)
- Lindzey, G., ed., *Handbook of Social Psychology*. (Cambridge: Addison-Wesley Publishing Co., 1954)
- Moore, C. B., and Cole, W. E., *Sociology in Educational Practice*. (Boston: Houghton Mifflin Co., 1952)
- Myrdal, G., *An American Dilemma: The Negro Problem and Modern Democracy*. (New York: Harper and Brothers, 1944)
- New York State Bureau of Adult Education, *A Venture in International Understanding*, Bulletin No. 9, 1953
- Radke-Yarrow, M., "Developmental Changes in the Meaning of Minority Group Membership," *Journal of Educational Psychology*, 44 (1953) 82-101
- Robbins, F. G., *Educational Sociology*. (New York: Henry Holt and Co., 1953)
- Wattenberg, W. W., "Eleven-Year-Old Boys in Trouble," *Journal of Educational Psychology*, 44 (1953), 409-17

³⁹ G. P. Murdock, *Social Structure* (New York: The Macmillan Company, 1949).

- Whiting, J. W. M., and Child, I., *Child Training and Personality*. (New Haven: Yale University Press, 1953)
- Zeligs, R., "Children's Concepts and Stereotypes of Norwegian, Jew, Scotch, Canadian, Swedish, and American Indian," *Journal of Educational Research*, 45 (1952), 349-60
- , "Intergroup Attitudes of Gentile, Jewish, and Apache Indian Children," *Journal of Educational Psychology*, 41 (1950), 243-48
- , "Races and Nationalities Most and Least Liked by Children," *Journal of Educational Research*, 48 (1954), 1-14

PSYCHOLOGY OF READING

Mental Development

READING IS A FAVORITE SUBJECT of the psychologist. In seeing how a child learns to read and in observing how the ability to read grows from the preprimer and the primer to Carlyle, Darwin, Shakespeare, Gibbon, or Einstein, we can understand a great deal about mental development. Accordingly, in this chapter on the psychology of reading, through the discussion of reading, let us try to illustrate some of the basic principles of mental development as effected by the educative process.

In the subject of reading we have one of the finest examples of the mental development of the race, or of mankind in general, as well as the mental development of the individual. Indeed the inseparable relationship between the mental development of the individual and that of the race has probably never been sufficiently appreciated.

There is no better example of the influence of man's cultural history upon his mental development than that afforded by this subject. This is seen in the development of language itself; in all the ideas, feelings, and information found on the printed page; in the alphabet and systems of writing; in paper, movable type, and bookmaking; in the educated minds that draw meaning from the page. Every one of these has had a long and interesting history.

They represent the epitome of what Simpson meant by the "new evolution" (Chapter III). To repeat, in the subject at hand we are not merely interested in the psychological aspects of learning to read, though this may be tremendously important to the teacher charged with teaching pupils to read. We are also interested in the development of the human mind.

Reading is a perceptual act. Reading is a perceptual process. Psychologically, the interpretation of gesture, graphic art, or the printed page is not different from other perceptual activities. The mariner who reads the stars, the Indian warrior who reads the moss on the trees, is reacting to meanings, to inferred significance, not to sensory data actually given—like color or brightness. And so is the man who perceives one object as near and another as remote, for there is no distance sense, nor any direction sense. Perceived distance and direction are interpretations or inferences. The perceiver reacts not to what is seen but to what the seen things signify. The brave who reads the moss on the trees, hoof-prints of horses, bent twigs, twisted grass, smoke signals, pictographs inscribed on the face of a rock, is in each case making a similar psychological reaction. He is going beyond the sense data actually given. He is reacting upon the basis of the signal properties of the stimuli. His reactions are dependent upon his optical mechanism, but not determined by it, as are brightness and color; he is "seeing" with his existing store of knowledge. Such is the character of all perception. The man who perceives a congeries of noises as an automobile wreck, or who reads an account of it in his local paper, ascribes to the sound, or to the printed symbols, these signal things, what is neither heard nor seen—namely, meaning. Thus reading differs from other forms of perception merely in that the sense data belong to the field of graphic language and as such have been provided by another for purposes of communication.

Once when the Medes and Lydians stood opposed, ready to fight a bloody battle, the heavens suddenly darkened and the sun lost its light. Then they recognized that their gods, Ormuzd and Mithras, were

angry at their deeds; they thereupon lowered their weapons, and concluded a peace with each other.¹

We *sense* in an eclipse just what the original structure of the organs of mind requires.

But through the ideas and skill obtained by former experience, we observe much that remains hidden to the inexperienced, and add to the sensation numerous psychical elements from our well-stored minds, which were not immediately given in the observation. The mind apprehends outer impressions in accordance with its wealth of knowledge gained through former activity.²

While the eclipse is *sensed* in accordance with the original structure of the appropriate organs of mind, it is perceived in accordance with the existing fund of knowledge of the individual or the group. This astronomical phenomenon which we observe with as much complacency as is possible in the presence of any great natural phenomenon has been experienced with horror by the savage. When the movements of the heavenly bodies gain a fixed meaning in the religious thinking of a people, this astronomical event must, in accordance with their ruling idea, be apperceived, in the words of Lange, as "a religious event." By the fact that each act of perception is achieved in accordance with the present store of knowledge we can understand how the selfsame event can be interpreted in so many different ways.

As De Garmo said, perception "is then in general the process of giving significance to facts by relating them to our more firmly established knowledge."³

Enough has now been said to prove the general law of perception, which is this, that *while part of what we perceive comes*

¹ K. Lange, *Apperception: A Monograph on Psychology and Pedagogy*, trans. by members of the Herbart Club (Boston: D. C. Heath and Co., 1893), p. 89. Quoted by courtesy of the publishers.

² *Ibid.*

³ Quoted by B. C. Mulliner in *The Application of Psychology to the Science of Education* (New York: Charles Scribner's Sons, 1898), p. lxx.

*through our senses from the object before us, another part (and it may be the larger part) always comes out of our heads.*⁴

This basic principle of perception, formerly called apperception, was utilized by Herbart (1776-1841) and his followers as a basis of one of the most comprehensive systems of teaching in the history of education. The system was embodied in the celebrated *formal steps*, discussed later. It is rivaled in importance only by the child-centered-activity movement of Parker and Dewey. The latter actually incorporated much of the Herbartian system.

Knowledge of the conditions of perceptual development immediately becomes knowledge of mental development; the principles of perceptual development are common to all aspects of mental development except those attributable to physiological maturation. The nature of mental development being what it is, education can take place in but one way—by adding the new to the old and in terms of the old. Here, “adding” may stand for comparing, contrasting, synthesizing, assimilating, and so on. It is a well-known fact that the people who inhabit isolated mountainous regions see relatively little in nature, which is arrayed so lavishly all about them. Lacking old heads under which to dispose of the new, and lacking fixed concepts in terms of which to classify and compare, few definite observations about nature are made. Education enables the individual to perceive meaning where none formerly existed, to appreciate, understand, and observe, to note uniformities and cause-and-effect relationships, at an ever increasing pace. “According to this, we see and hear not only with the eye and ear, but quite as much with the help of our present knowledge, with the apperceiving content of the mind.”⁵

If we can see how it comes about that we see and hear with our present store of knowledge as well as with our eyes and ears, we shall see one of the ways in which the mind develops, and at the same time appreciate better what our task in education is. That past experiences (or past reactions, if the reader prefers) leave

⁴ James, *The Principles of Psychology* (New York: Henry Holt and Co., 1890), Vol. 2, p. 103. Quoted by courtesy of the publishers.

⁵ Lange, *op. cit.*, p. 21.

certain effects upon us is beyond cavil. Once a person has experienced or reacted, his mind is no longer a tabula rasa. These effects persist and have a part to play in his future life. They provide a background for subsequent experiences. This background gives meaning to the daily events of life and in part determines how they shall be experienced—that is, perceived and reacted to. *Education thus provides new worlds upon new worlds.* The best-educated persons, then, are those who have the best background in the light of which to interpret and react to the most important events of life.

The foregoing is in large part the psychological basis of reading readiness, general intelligence being another major part. Thus in addition to the attainment of a given mental age, a child should have had certain experiences before he is ready to begin learning to read. This holds also throughout his entire educational career. He must have had certain experiences to read Gibbon, Milton, or Carlyle. Moreover, this principle of mental development is not confined to reading. It is just as applicable to listening, looking, smelling, or tasting, or to learning in general.

Comments on the History of Reading and Writing

Reading, as we know it today, is one of the late achievements of man. But it is only the highly developed skill of reading printed text that is numbered among the modern achievements. While now probably not more than one-half of the peoples of the earth have this attainment, it would be a mistake to suppose that the rest cannot read at all. Reading in some form has been practiced in all stages of civilization. If "reading" be defined as the interpretation of graphic symbols, it is many thousands of years old. Reading, we may surmise, is in a sense as old as signmaking. If reading be made to include gesticulatory signs, it is as old as language itself. If it be restricted to the interpretation of graphic language, it goes back at least to the Old Stone Age.

Stages in reading and writing. Clodd is of the opinion that in Babylon writing had long since passed the pictorial stage by 6000

B.C. Egyptian writing was partially alphabetical as long as seven thousand years ago.⁶ Inscriptions dating back to 3000 B.C. have been unearthed in Crete.

In all these cases, and especially in Egypt and Babylonia, there are abundant indications that reading and writing were already most ancient practices, with the story of their origin enshrouded . . . in mystery, and told only in myth and legend.⁷

Various peoples and tribes on every continent have developed systems of writing, independently. Some of these systems have reached a high state of completeness, some have been arrested at one or another stage, some are still in their rude beginnings. Yet so far as each has gone it resembles almost every other in the general lines of its development. One finds striking resemblances, even in details, in comparing such widely separated systems as the Maya of Yucatan with the Egyptian, or the Ojibwa of North America with the Babylonian.

It is reasonable to suppose, as has often been suggested, that the first form of writing was executed by means of gesture and that this "drawing in the air" was genetically prior to picture writing. Whatever paleolithic man may have practiced in the way of gesticulatory and verbal language must be left to the imagination; but specimens of his graphic language endure to this day. Hirn says of the earliest drawings of man:

these designs are only a projection on a different surface [sand, bark, bone, and stone] of the hand movements with which in their pantomimic language they describe the outlines of the objects in the air. One is tempted, therefore, to find in these transferred gestures the origin of pictorial art.⁸

In support of the contention that the art of picture writing is unbelievably old, Clodd cites archeological finds of drawings of

⁶ E. Clodd, *The Story of the Alphabet* (New York: D. Appleton-Century Co., 1900, 1915).

⁷ E. B. Huey, *The Psychology and Pedagogy of Reading* (New York: The Macmillan Company, 1908), pp. 187, 188. Quoted by courtesy of the publishers.

⁸ Y. Hirn, *The Origins of Art* (New York: The Macmillan Company, 1900), p. 156.


animals now extinct, notably those discovered on cavern floors of France and Belgium.⁹

(1) *Pictographs*. The earliest pictographs of a tribe—those representing the beginning of graphic language—bear considerable likeness to the object portrayed, although imitative fidelity was not insisted upon. The economy of sketching a few essential details was generally practiced. Later a whole was represented by a part—a paw, a head, or the like. Both of these practices follow the normal operations of perception, in which a part may stand for or reinstate the whole of which it was formerly experienced as a detail. With further evolution, signs became more and more conventionalized, with the consequence that likeness between pictograph and object could be dispensed with altogether. Here we see a movement toward the symbolical and away from the strictly pictorial. Further evolution took place in the direction of convenience in portrayal. Huey suggests that a factor in the evolution of the ancient Chinese character for sun from ☉ to 日 and for moon from 月 to 月 was the greater ease of drawing with the Chinese brush pen. Similarly, the character for song 口 (mouth and bird) becomes 口 and that for light 日 (sun and moon), 日. Likewise, 星, a conventionalized simplification of a star, becomes the symbol for sky.¹⁰

(2) *Ideographs*. Conventionalized characters substituted for pictographs are known as *ideographs*. Conventionalization had the advantage of permitting the symbolization of feelings and abstract ideas as well as concrete objects. Ideograms were metaphorical to a considerable degree. Huey tells us that the Egyptians, curiously enough, represented a mother by a vulture, a bird thought to nourish its young with its own blood; a king by a bee, signifying a monarchical form of government; justice by an ostrich feather, the feathers of this bird being supposedly of equal length; knowledge by a roll of papyrus, this being the chief writing material of that day. The Dakota Indians symbolized plenty by a buffalo head, a pit, and a forked stick denoting support for the

⁹ *Op. cit.*, p. 22.

¹⁰ Clodd, *op. cit.*, pp. 198-99. Quoted by courtesy of the publishers.

drying pole. The Ojibwa represented winter or the season of snow thus . The meaning of the red tomahawk and the pipe in Indian lore is well known.¹¹

As the characters pass from the pictorial to the emblematic or the symbolic, their meaning, obviously, becomes more obscure, save to the initiated. They do not [he quotes from Mallery] depict, but suggest objects; do not speak directly through the eye to the intelligence, but presuppose in the mind knowledge of an event or fact which the sign recalls. The symbol of the ark, dove, olive branch, and rainbow would be wholly meaningless to people unfamiliar with the Mosaic or some similar cosmology, as would be the Cross and the Crescent to those ignorant of history.¹²

In the more advanced stages of ideographic writing, such as the Egyptian and the Chinese, modifiers or determinatives increase greatly the number of ideas a symbol may be made to express. For the Chinese, the symbol of white with the symbol for a tree as a prefix stands for cypress; with the symbol for man as a prefix, it stands for elder brother.¹³

(3) *Phonograms*. Phonograms are written characters that symbolize the names of objects rather than the objects themselves. The development of spoken language created a need for graphic symbols that could be made to represent the sounds of spoken signs. This would, says Huey, solve for all time the problem of facile communication. Inherently, phonographic writing has no particular advantage over ideographic writing, save the fact that it served as an important intermediate step between ideographic and alphabetic writing. It was a step in the right direction, since it drew attention to the fact that graphic characters could be made to symbolize word sounds as they became constant symbols of those sounds within any language system. There was one very practical advantage in phonographic writing, in that it made the fullest possible use of oral language structure. A person did not have to learn two separate languages, so to speak—one for reading

¹¹ *Ibid.*, pp. 196-97.

¹² *Ibid.*, p. 66.

¹³ Huey, *op. cit.*, p. 200.

and writing and another for speaking. The same words and syntactical elements were used by two different methods of expression. In fact, phonographic writing presented a situation quite similar to that confronting our youth today as they learn to read—as they undertake to learn the written form of words with which they have already become familiar in oral form. Here knowledge of word meaning, sentences, parts of speech, grammar, and syntax learned in speaking situations *transfers* to reading situations and makes the process of learning to read very much easier.

However, phonographic writing has all the disadvantages inherent in ideographic writing. Whereas in the latter there are required as many signs as there are ideas, in the former there are required as many separate characters as there are words. As Huey suggests, it was a long time before men came to realize that all the words used in speaking, or all that ever shall be used, can be expressed in a few elementary sounds. The employment of visual signs for word sounds without any consideration of the sounds' inherent meaning freed the writer from all obligation to produce in the written symbol any likeness to the thing symbolized.

The Chinese language is made up of monosyllabic words. Since there are but a few hundred of these, each word sound must have several meanings. In their written language these homophones present a considerable problem, since, as their language is non-alphabetic, they cannot vary the spelling as we do in the case of our homophones, as in *write*, *rite*, *right*, and *wright*. This difficulty is circumvented by the placing of an ideograph, as a key or determinative, after a phonogram. Taylor informs us that the phonogram Chinese *Pa* has eight distinct significations—that there are eight different words so pronounced. When followed by the ideographic key for "plant" it means "banana tree"; when followed by the key for "iron" it denotes "war chariot"; when followed by the key for "mouth," it denotes "cry," and so on. He further relates that the Chinese written language practically requires only 1144 phonetic signs and 214 ideographic keys. And "by means of these 1358 conventionalized pictures, taken in groups, two and

two together, any one of the 40,000 words in the Chinese language can be written down without ambiguity." ¹⁴

(4) *The alphabet*. Taylor suggests that one of the prices the Chinese have had to pay for their failure to analyze their monosyllables into an alphabet is the taking of twenty years to learn to read and write, instead of five. Clodd agrees that this is theoretically correct, but points out that for practical purposes the Chinese can do with considerably less than complete mastery of the language. Without doubt the alphabet is one of the truly great intellectual achievements of all time. The fact that we can write the 600,000 words in our language with the use of 26 letters is proof of its economy.

The cuneiform writing of Chaldea, Babylonia, and Assyria, like the written language of the Chinese, progressed from the pictograph and ideograph stages to phonograms and syllabary, together with homophones and determinatives. At this stage development was arrested, just as with the Chinese. Of the forms of cuneiform writing, according to Huey, probably all except the Persian stopped short of the development of a true alphabet. The Egyptians made the momentous step at an early date, although they merely added alphabetic writing to their pictographs, ideographs, and phonograms. "But the scribes clung to their ancient characters with a greater tenacity even than we do to our silent letters, and the writing of Egypt remained a confusion, their magnificent discovery going begging for a nation that could make use of it." ¹⁵

Learning to Read

Reading readiness. Our public schools operate under state statutes. School laws prescribe when a child may enter school. The age at which he is allowed to enter school more or less conforms to the age at which he *must* do so. In communities where there are

¹⁴ I. Taylor, *The Alphabet* (2 vols. New York: Charles Scribner's Sons, 1899), Vol. 1, pp. 28 ff.

¹⁵ Huey, *op. cit.*, p. 217.

no kindergartens, this age is, as a rule, six years. Equality before the law is a cardinal principle in our legal structure. But the natural and social laws under which man also lives do not recognize statutes. This is not in any way to suggest that there is anything wrong with the practice of enrolling all our children in school at the age of six. Trouble starts when we assume that all children should begin to learn to read during the first year and that they should all attain an acceptable standard by the end of the first school year.

Assuming that we should have a graded system at the primary level, which is open to question, it may be argued that progress in reading occupies too large a place in determining whether or not a child is ready to undertake 2d-grade work, which by the same token all too often means 2d-grade reading. We teachers may say we really do not expect all children to make satisfactory progress in reading in the course of the first year's instruction. We have come to expect that from 10 to 15 per cent of the children will have to repeat the grade. But we may wonder if this is much more than acceptance of a statistical fact. As a general rule we still try to bring all children up to a certain standard by the end of the first year, and otherwise behave as if we believed all children could make it if we knew the right method, had the right material, and had sufficient time for helping the slower pupils. Actually, we might succeed in this to a considerable extent under such conditions. But we may also ask, "What is the hurry?" Would it not be better to delay reading for a while and in the meantime work on some other aspect of the child's development?

Too much too soon. A pretty good defense could be made for the thesis that our reading clinics and remedial-reading programs are testimony to the unwisdom of our haste.¹⁶ Reading is a complex mental task, readiness for which, or the learning of which, is a function of the child's level of mental development. The level

¹⁶ As complete a summary and as adequate an interpretation of the experimental literature on reading readiness as one can well find is given in I. H. Anderson and W. F. Dearborn, *The Psychology of Teaching Reading* (New York: Ronald Press, 1952).

required is of course relative, relative to methods used, time and effort expended, and to our expectations. No doubt a normal 3-year-old child could be taught by someone, by some method, to read, to some extent. But within any given method and set of objectives at any given age children will vary enormously in the progress made.

The facts at our command warrant our saying that readiness, as evidenced chiefly by progress when he begins, is a function of the child's attained level of mental development. A great deal more is meant by the term "mental development" than mental age or intelligence; but we do not wish to suggest that all aspects of mental development are equally important. Of all the measurable aspects of mental development, obviously the level of intelligence is the most important here, in the sense that no other aspect correlates so highly with reading achievement. With these reservations it makes sense to say reading readiness is a function of total mental development—which is meant to include social development, emotional maturity and stability, and even motor development to a limited extent. But somewhere the line must be drawn. It seems a bit careless to say that reading readiness is a function of total development. There is a difference between *total mental development* and *total development*. Every part of the child develops. That is what is meant by "growing up." His ears and hands and feet, his bones, teeth, and muscles, his height and weight—they all develop; and one can determine age norms for each, or others when required. But these kinds of anatomical and physiological growth, taken separately or collectively, are related neither to reading achievement nor to mental development.¹⁷ This last statement, while about as true a statement as one can ordinarily make, is not quite 100 per cent true. There is a slight positive correlation between height and weight and mental age (chronological age held constant) and reading achievement. By using large samples, which reduce sampling errors, investigators have obtained statistically significant correlation coefficients of a mag-

¹⁷ F. T. Tyler, "Concepts of Organismic Growth: A Critique," *Journal of Educational Psychology*, 44 (1953), 321-42.

nitude of about .20. The predictive value of coefficients of this magnitude is negligible, being less than 2 per cent better than chance. This means that if we know height age, weight age, dental age, and so on of a 1st-grade pupil, we can predict his progress less than 2 per cent better than if we had merely guessed at it in the first place. Something more will be said about this issue in Chapter VIII.

Returning to the question of mental maturity, let us try to explore a bit further the question of reading readiness. Here we cannot do more than indicate some of the important facts that bear upon the problem. Anderson and Dearborn, cited earlier, have summarized the data very adequately. To repeat, when we say that a pupil is or is not ready to begin to learn to read we merely mean that he is or is not ready at a practical level, ordinarily that envisaged by the term "1st-grade," or, "our 1st-grade." In "our" 1st-grade we also aim to be practical. We try to establish a program in which the average pupil can succeed rather well, and in which the somewhat less-than-average can get along passably with extra help and extra practice. There is also the expectation that provision will be made for the above-average pupil to move along at an accelerated pace. Beyond the fact that one is inclined to wonder what the hurry is, this looks like a pretty sensible arrangement. In addition to complaining about the hurry, we should consider the possibility that the below-average pupil who manages to get along, but with difficulty, would be better off if he delayed starting the race—to say nothing of the 10 or 15 per cent who do not make it at all.

Let us see what some of the inequalities are. The average mental age of 6-year-old children (all 6-year-old children) is of course 6:6, six years, six months. About 15 per cent of these score MAs 5:6 or less; that is, are one full year retarded. This is enough to put almost 5 such pupils in each class of 30. About 3 per cent—about enough for 1 per class of 30—score MAs of 4:6 or less. Corresponding percentages are found for acceleration of one year and two years. These differences in MA are related to, and to an extent aggravated by, other conditions of mental maturity. In

social development there are large differences in readiness for participation in group life, for living and working together. Some children are timid, shy, or retiring, or for other reasons cannot work at their best level with other children. Others are meddlesome, bothersome, or are distracted by the group. Children differ enormously in language development. The speaking and listening vocabularies of some are greater than they really need; those of others are meager and inadequate. Some are accustomed to speaking and thinking in complex sentences, while others have made little progress in this direction. There is a large group of factors that may be listed under the general head of experience—as provided in the home through association with adults, through listening, through plays and games, through travel, through educational experiences of all kinds. These are as varied, and 1st-grade children are as variously equipped in them, as American homes and communities themselves.

Not learning to read. In view of these limitations it is inevitable that many children will not learn to read well, will learn at great cost, or will fail to learn. It is doubtful that it matters to children whether or not they learn to read in the first grade, except that it is a common saying that that is when one learns to read. Some children are ready to read, are ready to use reading for learning and entertainment, and in a sense need to learn to read in the first grade, or even earlier. Many others are not ready to read, are not ready to use reading, and do not need to learn, save for the fact that other children in the grade are learning, that the school is prepared and ready to teach them, and that the parents are expecting them to learn to read.

Of course there are teachers and school systems that can wait until children are ready, and not just wait, but wait and help them get ready. These are exceptions. Moreover, they are not generally accepted. No plea is made here for letting the child decide for himself, without help, when he is to take up reading. Teachers can decide when it is time to start, and do so pretty well. Nor is this to suggest that the child should be required to address himself immediately to the task; at least there should be no cause for

alarm if he does not do so. On the other hand, there would appear to be no harm in trying to enlist his interest if it is fairly certain that he has the maturity level.

Learning not to read. It is difficult to see any good in spending a year in reading without progress, or with a little progress at great cost. It is easy to see much harm. Should we teachers redouble our efforts, or re-examine our objectives? It is, to say the least, understandable if the pupil who puts in a year in not learning to read, and who to boot is the object of invidious comparisons or of guilt-producing behavior at home, does not show up next year filled with enthusiasm for his reading lessons. Perhaps he has a new teacher, or the same teacher takes another turn. This time it will get done! At least a good start! And it may, but the task is made more difficult, not easier, by previous failure. Given more failure the second year, more trips to school by the mother who "can't see why . . .," more "help" from mother or father, and we can see how escape from reading actually becomes rewarding. As these avoiding reactions are rewarded we have exactly the conditions required for learning *not* to read. Now the child is ready for a remedial teacher, who will, if she happens not to be a good one, "give him the extra repetition and practice he needs." Said teacher and said method may succeed. But the task has been made needlessly hard. What he really needs by this time is a reconstruction of his personality.

Surely all this must sound oversimplified. There will always be poor readers among both children and adults, poor in the sense that their attainments are far below average for their age groups.

One of the queer problems is the severely retarded reader—one whose reading age (RA) is two or three or even more years below his MA. There are students eight, ten, fifteen years of age, with normal or superior mentality and who have received regular instruction, who have either been unable to learn to read or who have defied instruction. We would think it impossible to keep such a pupil from learning to read, when we consider the excellent teachers and excellent teaching materials we have today. It

should be heartening to teachers to know that such dramatic instances of failure are rarely chargeable to poor teaching.¹⁸

The latter statement should be interpreted to mean an absence of poor teaching in the usual sense. These stark failures do not come from backward schools. They come out of well-equipped classrooms having competent teachers, where other children succeed. There remains the possibility that almost any teacher may be a poor teacher for a given child; also, that too much good teaching, or too much of a kind that is ordinarily good, may be poor teaching when applied too soon and too fast.

But even if we rule out this possibility, there still will be cases of failure in learning to read upon the part of pupils bright enough to have learned easily. Occasionally neurological examination shows brain damage that could account for the difficulty. But most of the cases of the kind discussed here show no such damage. Many of them, in fact most, are disturbed emotionally. Sometimes this appears to have some etiological significance; at other times it seems to be a result of failure in reading.

It is possible, just possible, that some cases of failure stem from strong emotional attachments between the child and one of his parents. The boy who cannot bear to have his mother out of his sight may well understand that learning to read for himself would undermine a pleasing relationship. Learning to read may be a kind of weaning for some overly dependent children. It represents growing up, a gaining of independence, which most children accept with much satisfaction.

The first step. As was seen at the beginning of this chapter, learning is essentially a process of effecting an assimilation of the new and the old. A part of what is meant by reading readiness is the acquisition of a fund of knowledge, perceptual and motor reactions, language skill, and so on, to serve as an adequate assimilative base, so to speak. Anyone who has had much experience with experiments in learning knows how difficult it is to learn a list of nonsense syllables as compared with a comparable

¹⁸ H. Robinson, *Why Pupils Fail in Reading* (Chicago: University of Chicago Press, 1946).

list of meaningful words. But the nonsense syllables are not wholly new. The constituent letters are familiar. They can be recognized at a glance, named, or written down. Think of the additional difficulty if the subject did not know any of these things to start with. Suppose further that he had not yet acquired habits of attention and concentration, or habits of visual discrimination and analysis. Something of the value of readiness may be seen in the difficulty of teaching the deaf child to read. How does one teach him the meaning of such symbols as "if" or "as?" We can do better with picturable words, but this also gets us back to familiarity, "adding" the new to the old.

The average six-year-old child has a vocabulary of several thousand words. This he uses freely in talking, listening, and thinking. The prevailing method of teaching, now and in the past, is to lead the child to associate the written word with the sound word he already knows. This may be supplemented with pictures, as when picture and word are presented simultaneously as Comenius did in his *Orbis Pictus* three hundred years ago. There is no special advantage in the picture, except the factors of human interest and the encouragement of resourcefulness and self-reliance. Psychologically, it is the same phenomenon, associating a new stimulus object with an old and familiar response. When the new stimulus object is capable of awakening the same response as the old stimulus object, sound, the two objects become interchangeable and have the same meaning.

Any teacher knows that such associative learning may require several repetitions, and that some children will require several times as many repetitions or trials as others. But the teacher may not know or fully appreciate that in learning there must always be more than repetition. Of course, everyone knows that learning takes brains, and that children differ greatly in this respect. Learning in school also takes experience. Everyone knows children differ here also. But if we take some extremely elementary form of learning where "brain power" and experience are scarcely variables, we also find that repetition is not enough; it is necessary, but not sufficient. There must be perception or differentia-

tion of cues (stimulus objects). Thus the child in learning to read needs good powers of auditory and visual discrimination. What is learned is actually a response. To learn a response it must be made, inwardly or outwardly. To learn a response, the child, the animal, or other subject must be capable of making the response. Moreover, to learn, a child (or any other subject) must be motivated. This is true (1) because motivation defines the task, and (2) because it is essential to *reward*. In the prevailing learning theory reward is regarded as an essential element in the learning process.¹⁹ Perhaps most children come to school sufficiently motivated for the purpose of getting through the first steps in reading. However, if there occurs initial and protracted failure, in consequence of too much too soon, things change. If pressures are great and failure persistent, escape or avoidance responses become rewarding. In this situation conditions are right for learning *not* to read.

One wonders if there is not something about the teaching of beginning reading that makes learning extremely difficult. Certainly it is difficult, although it may not be needlessly difficult. Reading is a form of language usage, which the typical child of six has already fairly well mastered. He has a large vocabulary, knows the ordinary usages of syntax, can converse in complete sentences, and in intelligent ways, upon a wide variety of subjects. He probably knows close to 20,000 words, counting derivatives. This means he has been learning 5000 or 6000 new words a year, and what is most remarkable, without going to school and without much effort.

The typical basal-reader series will not present much more than 300 words, counting derivatives, in the first grade. The average pupil will not learn all of these, but he will pick up a few from other sources. Let us say the average first-grade pupil will not

¹⁹ It should be said that there is more than a single approach to the psychology of learning. While everyone admits the great importance of motivation and reward, all do not regard them as being absolutely essential. This theoretical issue is discussed more fully later.

learn more than about 300 sight words in the course of a year, as compared with the 5000 spoken words he may learn.

There is a certain little girl in the author's community whom he has a particular interest in. One day last summer, when she had just passed her second birthday, she and he came upon an ice-cream vendor's stand. Having previously learned that she had had no experience with ice-cream cones, he decided to correct that deficiency. Being in the teaching business and wanting to make the experience count for as much as possible, as he handed her a nickel for the man he told her, "An ice-cream cone costs a nickel." Nothing more was said about the transaction. Some two weeks later, when the two again came upon the stand, she volunteered the information that an ice-cream cone costs a nickel.

Transfer this sentence to a first-grade reading situation. To the best of the author's knowledge the little girl did not beforehand know what a nickel was, nor what "ice-cream cones" were, nor what "costs" meant. In reading, we teachers would not undertake to teach in this "inefficient" way. The child would be allowed to see and feel the nickel or even to carry it around a little in her pocket if she did not already know about nickels. We would cut out pictures of ice-cream cones, or make a model. Since it is so difficult to teach "costs," we would probably avoid that altogether if she did not know the word. Then think of the repetitions that would be provided. Even then, we would not be surprised that the six-year-old (not the two-year-old) could not read the sentence a week later.

Just a couple of suggestions. In the first place, *reading* the expression "An ice-cream cone costs a nickel" is a pretty pale experience in comparison with living it in a social situation. Moreover, most of the words, phrases, and sentences found in a first-grade reader series suffer in vitality in comparison with the sentence we have been considering. Any emotional edge they have is soon dulled by repetition.

Perhaps there may be some lesson for us in the fact that the child learns to talk and listen with an ease that seems amazing,

and does so with little actual instruction of a formal kind. Not only does he live the experiences he is talking about and listening to so continually, but he spends most of his waking life at it. In the first grade he reads but little, and for the most part about things less interesting by far than those situations he really lives the rest of the time.

In the second place, and this is just a suggestion, learning to read may be made needlessly difficult by insisting upon perfection. The child need not know every word in a sentence in order to apprehend its meaning; or he need not get all the meaning in order to get some of it. Quite young children frequently get erroneous meaning or only partial meaning from listening to adults or older children. They often use words erroneously and use expressions that are grammatically incorrect. How do they correct all these things? Not by slowing down, not by ironing out all the imperfections before going ahead! They go ahead at an accelerating pace. The little girl mentioned above may have had little understanding of the word "costs," or she may have misunderstood it entirely. In either case, is not continued use of a word in a variety of situations the best way to learn its true meaning?

Again, this is just a suggestion. Many methods of teaching reading have been tried out. The authors and publishers of basal-reader series do not take their work lightly. It is a fact that great care is exercised to present interesting reading situations. If an author must confine himself to a hundred words, he certainly is limited in the things he can write about. This, however, is part of the issue raised here. The possibility that he should not place such severe restrictions upon himself seems worth considering. At present we may try to teach 300 words in the first grade. Let us say that the average pupil learns about that many words, including a few from other sources—at least learns them fairly well. Just to sharpen the issue, let us ask what would happen if we exposed first-grade pupils to 1000 words, admitting frankly that we did not expect the pupils to learn anything like all of them.

None of the foregoing is intended to give aid and comfort to those critics who deplore the use of basal-reader series. Obvi-

ously, teachers like to use such series, which today are really excellent examples of good teaching material.

Eye-Movement Data

Eye-movement phenomena are now so well known it is unnecessary to present any detailed account of the experimental work. There are no major areas of disagreement. Unless new problems arise, we may assume that experimentation in eye movements is behind us, although no less important for that reason. A Frenchman, Javal, called attention to the fact that in reading the eyes do not move gradually and steadily across the page, but proceed in a series of quick jumps or saccadic movements, interspersed with pauses. Reading is done during the pauses or fixations. Javal reported this phenomenon in 1879. Some years later other workers became interested in it, and by 1906 the facts were fairly well established in a general way.²⁰ Later, Schmidt and Buswell devised a method of recording eye movements on motion-picture film; that is, recording beams of light reflected off of the cornea.²¹

The following are some of the principal facts brought to light: The average high-school senior or college student makes about eight fixations per line, on the average. Buswell reported about six; however, he used a 21-pica line length in his work, rather than the more standard 24-pica line. Moreover, he used extremely easy reading material. Eye movements have a developmental history. In grades 1B and 1A, Buswell obtained 18.6 and 15.5 fixations respectively per 21-pica line. This figure was reduced to approximately 6 in the second year of high school. Individual differences are large, even among mature readers. The fastest readers average about three fixations per line of conventional

²⁰ W. F. Dearborn, "The Psychology of Reading: An Experimental Study of the Reading Pauses and Movements of the Eye," *Archives of Philosophy, Psychology, and Scientific Method*, 1906, No. 4.

²¹ W. A. Schmidt, "An Experimental Study of the Psychology of Reading," *Supplementary Educational Monographs*, 1917, No. 2; G. T. Buswell, "Fundamental Reading Habits: a Study of Their Development," *Supplementary Educational Monographs*, 1922, No. 21.

length. This means they read three to four words per fixation. The slowest, the worst readers, require a dozen or more fixations.

The average fixation time of mature readers is approximately 0.25 second, 250 milliseconds. This rate is reached at about the fifth-grade level, and remains more or less constant thereafter.

A third factor is movement time, time required for moving the eyes from one fixation point to another. Ordinarily this is about 10 per cent of the fixation time. Schmidt obtained an average movement time of 22 m. s. between pauses; and 40 m. s. for the return sweep.

A fourth factor is regressive movements. The average reader can be expected to make a little less than one such movement per line. Poor readers make more of them than good readers. The chief cause appears to be misreading at an earlier point in the sentence or even in a previous sentence. It is as if the sentence as construed does not make sense, and the reader looks back to find the difficulty.²²

All of these eye-movement phenomena vary with several conditions, as does the rate of reading itself. Some of these conditions are shown in Table VII.²³ One way or another they are functions of the difficulty of the material, the mental set, reading habits, and perceptual abilities—rate of perception and width of perceptual span. Reading habits and perceptual abilities are probably to some extent related and to some extent independent.²⁴ We may be sure that the eye is not the limiting factor, at least in a practical sense. It is capable of doing much better. This is shown first by the fact that in reading difficult matter, perceptual span (number of words seen at a fixation) decreases, perceptual time lengthens, and the number of regressive movements increases. Only movement time remains constant, more or less. Were all these eye-

²² G. Fairbanks, "The Relation between Eye-movements and Voice in the Oral Reading of Good and Poor Silent Readers," *Psychological Monographs*, 48 (1937), Whole No. 215.

²³ I. H. Anderson, "Studies in the Eye-movements of Good and Poor Readers," *Psychological Monographs* 48 (1937), Whole No. 215, pp. 1-35.

²⁴ J. B. Stroud, "Visual Perception as a Factor in Rate of Reading," *Journal of Educational Psychology*, 36 (1945), pp. 487-98.

TABLE VII

RELATION OF EYE MOVEMENTS TO DIFFICULTY OF MATERIAL
FOR UNSELECTED AND POOR READERS

<i>Measure</i>	<i>Primer</i>		<i>Moderately Difficult</i>		<i>Very Difficult</i>	
	GOOD	POOR	GOOD	POOR	GOOD	POOR
Duration Fixations	.246	.295	.255	.304	.277	.316
Size Fixations (in <i>ems</i>)	3.40	2.66	2.92	2.68	2.66	2.60
Regressions (per line)	.44	1.01	.70	1.04	.92	1.28
Reading Rate (in <i>ems</i> per min.)	758.2	497.4	690.9	489.8	558.1	454.3

movement phenomena determined by the eye, they would be constant from one occasion to another, and probably from one person to another, since eyes are fairly standard. We know further that mature persons are capable of perceiving (and reproducing) larger phrases—up to half a line—when such phrases are presented one at a time by a tachistoscope, as when flashed on a screen for just an instant, say one-tenth of a second. The reason we know the phrase is read at a single fixation is that the time is much too short for two fixations. Moreover, whereas the average person requires one-fourth of a second for a fixation in a normal reading situation, he can easily perceive (and reproduce) a phrase shown for no longer than one-tenth or even one-hundredth of a second under normal conditions of illumination for reading. If candle power is increased sufficiently, he may succeed at one-thousandth of a second.

All this suggests that these eye-movement phenomena in normal reading situations are governed by central factors—factors of thinking, understanding, seeing relationships, and so on. Even so, the question of cause-and-effect relationships does not make too much sense, at least at the ordinary levels of reading achievement. It may be true that reading rate and concomitant eye movements are determined by rate of understanding; and it seems logical that

this should be so. But this is not tantamount to saying that nothing should be done about reading rate and eye movements. As is maintained in a later portion of this chapter, most persons who reach high school and college are needlessly inefficient in basic reading skills; many are woefully so.

Abilities and Disabilities

The best readers at a given age or grade level have the best minds, the best language ability, the best education—in short, the highest levels of mental development. The reverse is largely, but not altogether, true. Most poor readers are weak in all of these respects; a few are not. Here it is a question of reading comprehension. Reading rate is not at all closely related to general mental development. There are students who can read very rapidly (have good mastery of the basic skill of reading) yet who comprehend very little. As has been said, there are students, at least a few students, whose level of mental development equals or approaches that of the best readers but who can scarcely read at all. Thus, while there are children who display specific reading disabilities, there probably are no specific or special reading abilities, so far as comprehension is concerned.

In the field of reading authorities try to maintain a distinction between retarded readers and simply poor or deficient readers. Actually, the distinction is difficult to maintain in exposition, since the terms mean or can mean pretty much the same thing. However, we try to reserve the term *retardation* for cases reading significantly below their general levels of mental development, or more often, their MAs. About one-third of the pupils in a given grade read at a level not to exceed the median of the next grade below. Out of 1000 such children, approximately 333 would be found to be reading at or below the median level of the next grade below. Of these 333, perhaps 75 per cent will test below the normal IQ range (below IQ 90) on the Stanford-Binet Test.²⁵ Thus,

²⁵ D. D. Durrell, *Improvement of Basic Reading Abilities* (Yonkers: World Book Co., 1940), p. 278.

assuming these figures to be correct, we would have 333 pupils out of 1000 reading one or more grades below average for their grade, or their age. Of these, 25 per cent, or 83, or 8 per cent of the original 1000, would be retarded, by definition. Durrell and Sullivan, attacking the problem in a different way, found 15 per cent of 6000 pupils reading one or more years below their MAs, 14 per cent reading one or more years below their listening comprehension ages; 3 per cent reading two years below by both criteria.²⁶ The Durrell-Sullivan finding of 15 per cent is not incompatible with the 8 per cent of our hypothetical example. There we were considering only those dull pupils who were reading one or more years below their MA level. A pupil can be reading at or above his grade level and still be below his mental level. He can be "retarded" and still be average or above for his grade.

We should conclude that the abilities and experiences a child needs in order to comprehend what he reads are the same ones that he needs to comprehend what he hears or sees; the same ones he needs to understand anything. Correlations obtained between test scores of reading comprehension and those of listening comprehension are quite high and approach the reliabilities of the two tests.²⁷ In fact, if we could eliminate beforehand the small percentage of pupils who have specific reading disabilities, above the second grade, we could almost use reading comprehension and listening tests interchangeably. Almost any director of a college reading program knows that it is a common occurrence for a college student to seek help in reading. If his difficulty is one of reading rate, his deficiency is one of reading. But if his difficulty is inability to comprehend what he reads, his deficiency, in all probability, is more general and more basic. Reading comprehension is only one part of the problem.

²⁶ D. D. Durrell and H. B. Sullivan, *Durrell-Sullivan Reading Capacity and Achievement Tests: Manual* (Yonkers-on-Hudson, New York: World Book Co., 1937).

²⁷ L. E. Pratt, "The Experimental Evaluation of a Program for the Improvement of Listening in the Elementary School," Doctor's Dissertation, State University of Iowa, 1953.

Mental level. When we talk about mental maturity in connection with success in school, MA is easily the most important component. One could find literally dozens of reports on research showing relationships between reading scores and intelligence-test scores. Only one or two such investigations are cited here. Back in 1922, Gates reported an investigation in which he obtained an average correlation of .49 between Stanford-Binet MAs and composite reading scores (average correlation of coefficients computed separately for grades 3 to 8). On the same pupils he obtained an average coefficient of .71 between these same reading scores and several verbal group intelligence-test scores.²⁸ Bond reported a correlation of .73 between new Stanford-Binet IQs and reading comprehension (composite of four reading tests) for 200 tenth-grade pupils.²⁹ The average of the correlations reported by various investigators is about .60.

In investigations of this kind, variation in the magnitude of correlation coefficients should not be disturbing. Such variation is to be expected. Coefficients will vary with the reading tests and intelligence tests used, and with the nature of the sample. If in the particular sample used there is a wide range of talent—that is, if we have a wide range in reading abilities and a wide range in mental ability—higher coefficients should be obtained than if the range of talent is small. For example, if the pupils in the sample represent a select group in some way—above or below average in reading or in intelligence—the range is restricted and the obtained correlations would probably be lower than they would be if the sample were made up of pupils selected at random. We should expect to find lower correlations between reading and intelligence scores at the college level than in the high school or the elementary school; and for the reason that the range of talent is restricted by college-entrance requirements.

²⁸ A. I. Gates, "The Psychology of Reading and Spelling with Special Reference to Disability," *Teachers College Contributions to Education*, No. 129 (New York: Columbia University Press, 1922).

²⁹ E. A. Bond, "Tenth-Grade Abilities and Achievements," *Teachers College Contributions to Education*, No. 813 (Columbia University Press, 1940).

The nature of the intelligence test used will make a difference, particularly in the lower grades. When a group verbal test is used, particularly if it involves considerable reading, we would expect to obtain higher coefficients than when an individual test such as the Stanford-Binet or the Wechsler scale is used. This is probably not so important at the upper grade levels. It is true that most verbal group tests require considerable reading. While the effect of reading ability upon the scores has not been worked out carefully at the various grade levels, it would appear from indirect evidence that the effect has been exaggerated. Experience has shown that when high-school and college students who make relatively low scores on such tests are given extra time—double the standard time or even more—they do not improve their scores a great deal, and do not improve their relative position at all.

A more telling argument is the fact that reading comprehension scores correlate quite well with nonverbal intelligence scores. On the ACE Psychological Examination there is a language or verbal test, and also a quantitative or nonverbal test. The quantitative scale does not correlate with reading scores quite to the extent to which the verbal scale does, but the difference is not great. Similarly, the Wechsler test has a verbal scale and a performance or nonverbal scale. When these two scales are put into correlation separately with reading scores, little difference is found. For some data just compiled the author obtained a within-grades correlation of .61 between Wechsler performance scale raw scores and reading scores for 316 boys, Grades 3-6. The corresponding coefficient for the verbal scale is .58. For girls the coefficients are .67 and .59, respectively.

The validity of the intelligence test is probably more important than the form of the test. Gates in his investigation reported in 1922 obtained an average correlation coefficient of only .20 between nonverbal intelligence scores and reading-comprehension scores, whereas for the same sample of pupils he obtained an average coefficient of .71 between these same reading scores and verbal group intelligence scores. But the nonverbal intelligence

tests available in 1922 were of very poor quality, of very low validity. They did not correlate with much of anything to any considerable extent.

Reversals and laterality. Another factor associated with reading deficiency is error in reading the symbols, a condition that Orton has named *strephosymbolia*, meaning twisted symbols—a common form of which is the making of reversals, as in the confusion between *was* and *saw*, *on* and *no*, *b* and *d*, and so on. It is agreed that poor readers are more prone to this kind of error than are good readers. In an investigation of 100 poor readers, grades 3 to 6 inclusive, Witty and Kopel administered the Betts Test of Oculomotor and Perceptual Habits and compared the performance of these pupils with that of a sampling of slightly better-than-average readers in the same grades. A total of 108 symbols—letters, numbers, and words—was presented. The average number of errors made by the poor reading group was 17.2; by the good reading group, 2.4. The average number of reversals was 6.2 and 1.1, respectively.³⁰

“Laterality” or “sidedness” refers to the preponderant use of one member of the body in preference to that of the other member of a bilaterally symmetrical pair. “Handedness” and “eyedness” have been investigated more extensively than any of the other paired phenomena. Laterality has come to be associated with discussions of errors in reading by virtue of a putative connection between this phenomenon and hemisphere dominance, of which sidedness is a symptom. Mixed laterality—righthandedness and left-eyedness and vice versa—and imperfect laterality—lack of a decided preference—are said to reflect imperfect hemisphere dominance.

In their investigation just cited Witty and Kopel failed to find any relationship between laterality and reading disabilities. Their good readers and their poor readers were quite similar with respect to laterality data, as is seen in Table VIII. These findings

³⁰ P. A. Witty and D. Kopel, “Factors Associated with the Etiology of Reading Disability,” *Journal of Educational Research*, 29 (1936), 449-59.

corroborate previous investigations, for example, those of Kirk, and Woody and Phillips.³¹

Visual aberration. In clinical practice the eyes of the poor reader are examined as a routine procedure. While this is in every respect justifiable, it is to be understood that deficiencies in vision, at least in the ordinary sense, are not importantly associated with reading disability. If the seeing apparatus of every child in the nation who has reading difficulties were put in good order, no more than a very small dent would have been made in the number of reading deficiencies in our schools. Monroe,³² Witty and Kopel,

TABLE VIII
EYE AND HAND PREFERENCES (IN PERCENTAGES)
FOR POOR AND NORMAL READERS

Reading Ability	R	RL	A	LR	L	N
	Handedness					
Poor	75	8	3	8	6	100
Good	70	15	5	3	8	73
	Eyedness					
Poor	52	8	5	5	30	100
Good	54	13	3	9	22	78

and others have failed to find any very significant differences in visual acuity between poor and normal readers.

Muscular imbalance. Muscular imbalance has received considerable attention within the last twenty-five years. In reading and in seeing, the two eyes normally move co-ordinately, a condition that ensures the casting of the two images upon corresponding retinal points. When this happens, unitary vision results; when

³¹ S. A. Kirk, "A Study of the Relation of Ocular and Manual Preference to Mirror Reading," *Journal of Genetic Psychology*, 44 (1934), 192-205. C. Woody and A. J. Phillips, "The Effects of Handedness on Reversals in Reading," *Journal of Educational Research*, 27 (1934), 651-62. See also P. A. Witty and D. Kopel, "Sinistral and Mixed Manual-Ocular Behavior in Reading Disability," *Journal of Educational Psychology*, 27 (1936), 119-34.

³² M. Monroe, *Children Who Cannot Read* (Chicago: University of Chicago Press, 1932).

the images fall upon noncorresponding retinal points, doubling results. Normally there is a certain amount of disparity between the images of tridimensional objects, an amount which varies inversely with the distance of the fixated object. Ordinarily the amount of disparity is not so great as to destroy the eye's unitary vision. For plane objects, as in the words encountered in reading, under ideal circumstances there is no disparity. However, in some individuals, owing to muscular imbalance, there may occur sufficient disparity to prevent the securing of clear images. In 1932 Eames reported that the incidence of muscular imbalance in his reading disability cases was significantly higher than in his unselected cases.³³ Similar findings have been reported subsequently by Betts, Selzer, and Witty and Kopel.³⁴ The latter found that of 100 poor readers 29 gave evidence of slow fusion, and that in their group of good readers of the same age and grade level only one demonstrated the difficulty.³⁵

One wonders if the importance of vision has not been somewhat exaggerated in school, especially the care and protection of the eyes. Of course many children have eye defects, and these should be corrected in so far as possible. A few children are still so deficient after correction as to require special instruction. Many teachers are familiar with classes for partially sighted children—where children use their eyes sparingly, use “sight-saving” books and other materials, receive a larger percentage of their instruction orally than do children with normal sight. Partially sighted, or low-visioned, pupils are ordinarily considered to be those who test between 20/70 and 20/200 on the Snellen Charts; that is, in the better eye after correction. By the prevailing definition, those with less than 20/200 are blind. It is estimated that there are about

³³ T. H. Eames, “A Comparison of Ocular Characteristics of Unselected and Reading Disability Groups,” *Journal of Educational Research*, 25 (1932), 211-15.

³⁴ E. A. Betts, “Reading Disability Correlates,” *Education*, 56 (1935), 18-24; C. A. Selzer, “Lateral Dominance and Visual Fusion,” *Harvard Monographs in Education*, 1933, No. 12; Witty and Kopel, *op. cit.*

³⁵ Cf. T. H. Eames, “Visual and Related Factors in Reading,” *Review of Educational Research*, 19 (1949), 107-17.

100,000 partially sighted school children in the United States.³⁶ Perhaps 10 to 20 per cent of all school children have correctible defects.

While the school is responsible for educating low-visioned pupils and for detecting children with defective vision, the school is not responsible for the appearance of the defects and for the most part can do little to prevent them. Nearsightedness, farsightedness, astigmatism, strabismus (convergent, divergent, and vertical) make up the bulk of the defects. They are chiefly the result of growth functions, which taken together with disease and accidents account for nearly all visual defects. They are not caused by reading in bed, by reading too much, or to any great extent by reading in poor light. The eye is a highly adaptable organ. If the light is weak, the eye soon makes an adjustment, a process known as dark adaptation. Naturally there should be good light and books should have suitable paper and print, partly for aesthetic reasons and partly for general comfort. These things do not reduce visual defects appreciably. This is not to imply that some diseased eyes cannot be readily injured by use, or that the greatest safeguards should not be applied in the case of measles or scarlet fever.

The Basic Skill of Reading

Here the concern is with reading facility—the ease with which a person can read whatever he is prepared to read. To put it another way, it is rate of reading. Obviously, how well a person comprehends a passage is vastly more important than how long it takes him to do it. But rate is important; it can be taught and learned rather readily. Some persons typically read about 60 pages an hour, others no more than 12 or 15. We may assume that the difference lies very largely in the way they learned to read. Readers differ as much, probably a great deal more, in comprehension. The factors contributing to differences in comprehension

³⁶ A. O. Heck, *The Education of Exceptional Children* (New York: McGraw-Hill Book Co., 1953).

are learned also, at least in one sense, but in another sense they are not learned. More exactly, our mental abilities place severe limitations on what we can learn and on how readily we learn. Ordinarily, neither by specific instruction in reading nor by any other method can a group of high-school or college students be brought from a low level of comprehension up to a high level. We can accomplish this in the case of the basic skill of reading. That is, we can ordinarily bring people from a slow rate to a rapid rate.

Let us first take a look at the distribution of reading rates. These are usually expressed in words per minute. It is understood, of course, that reading rate is not a stable thing. By changing either the difficulty of the material or the instructions we can move the mean rate score of a random sample up or down quite a bit, perhaps as much as 50 words per minute, or in extreme cases, more. There is, however, one fairly stable element in reading rate; namely, the fact that as material and instructions are varied³⁷ persons tend to maintain their same relative position in a group. For example, if in a group of college freshmen a given student reads an extremely easy selection at a rate of 240 words per minute, and quite a difficult selection at a rate of 180 words, he would have about the same relative position in the group when they read the same selections. He would rank somewhere near the 25 percentile in both cases.

There is probably no great difference in reading rate between college freshman and senior high-school students. If the same reading selections are used, there would ordinarily be some correlation between rate scores and class position, because the selections would probably be progressively easier. At least if they were progressively easier, we would expect some upgrading of the rate scores. If we were to use material equally easy or difficult for college freshmen and for students in at least the last two years of high school, we should not expect much difference in reading rate. A good estimate would be that the *average* student in such a

³⁷ P. J. Blommers, "Rate of Comprehension of Reading: Its Measurement and Its Relation to Comprehension," *Journal of Educational Psychology*, 35 (1944), 449-72.

group would read about 250 words per minute, *on the average*. Let us estimate the standard deviation (SD) to be 50 words per minute. This may be slightly on the low or small side. We may be pretty sure it is not too high. The published data warrant the statement that the distribution is essentially normal; that is, conforms to the normal probability curve as seen in Figure 1.

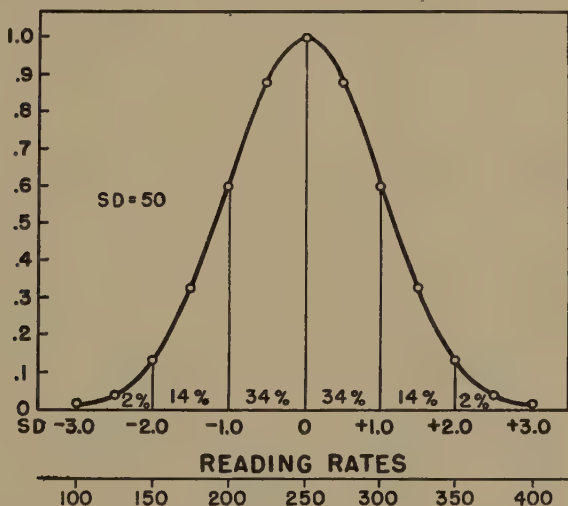


Fig. 1. Distribution of Reading-Rate Scores in Words per Minute

The reader will observe that there are two rows of data under the figure. The first gives SD units along the base, three equal units on either side of the mean; the second, the words per minute corresponding to each SD point. The approximates falling within the various SD points are given in the figure. These values are constants and apply to any normal curve. They are what we mean by "a normal curve." The one value that must be determined empirically in each case is the size of the SD in score units. In our case it is 50 words per minute. Thus, starting with the mean of 250 words at 0 SD, we add 50 words to the mean at $+1$ SD,

another 50 at $+2$ SD; subtract 50 at -1 SD, and so on. The size of the value for SD is a function of how the obtained scores (here reading-rate scores in words per minute) are distributed. In our example we have a rate of 100 words at -3 and one of 400 words at $+3$. If for example we had found an SD of 75, with the same mean, we would have 25 words per minute at -3 and 475 at $+3$. Assuming the mean of 250 and an SD of 50 to be absolutely accurate, and the distribution to be normal, we could say .13 per cent of the sample reads at a rate of 400 words per minute, or faster. Again, this seems a little low, in the writer's experience. It is suggested that 2 or 3 per cent of college freshmen may read this fast, on the average.

How fast can a person read? This is an interesting question to which no satisfactory answer can be given. But we do know something about it and it merits some discussion. If we assume that a person can read each line on a page in three fixations and requires only 200 m. s. per fixation (a very rapid reader might do this), requires 22 m. s. for each movement within the line and 40 m. s. for each return sweep, and makes one regressive movement of say 300 m. s. every other line, we would conclude that this person could, at least theoretically, read at a rate of about a line per second. Given a machine operating under these specifications, page after page could be covered at this rate. It is doubtful if any human organism could maintain these minimum time rates. Some fixations will take longer, on some return sweeps the right line will be missed, there will be blockings, lapses, and so on.

All this suggests that 90 to 100 pages an hour is about the theoretical top; the practical top is more like 60 pages an hour. Actually, there is more than one way of reading. In college reading programs it is rather a common experience to find a student who can achieve a rate of 1000 or more words per minute. This is about twice as fast, probably, as anyone can read. When these phenomenal readers have been placed before an eye-movement camera and given instructions to read as rapidly as possible, but to read all the material, they have been unable to exceed 500

words by very much.³⁸ The inference is that they achieve their phenomenal rates by some process referred to as skimming or skipping. Such readers have uniformly made high comprehension scores. On the face of it, this looks like a wonderful skill, and one that should be taught—if we had any good ideas of how to go about it.

Occasionally one encounters the popular notion that there are people who read by paragraphs or pages, whereas the rest of us must read by words and phrases. There are two or three things wrong with this. In the first place, the word is the unit of reading. We can read by words—perceive words as units without having to analyze them into syllables and letters—because words are standard. Pictorially, a word, or any given form of the word, is always the same. Hence we learn to recognize it as a unit, with relatively little visual analysis—helped out, of course, by context. Pages and paragraphs are not standard, nor are sentences. A reader practically never sees the same sentence twice. He can comprehend a sentence only by comprehending its constituent words. The word is different. It can be comprehended without comprehending its constituent letters. There is the further fact that sentences and paragraphs cannot be brought into focus without getting the page so far away that none of its words can be seen. This is not to say we cannot, or should not, teach reading by the sentence method. But this is the sentence method of teaching, not the sentence method of reading. In a sense we do read by the sentence method; but this is because the sentence is a unit of thought, not because it is the unit of seeing.

How do we account for the wide differences we find everywhere in the basic skill of reading? In the most general way we can say that these differences are a function of the differences in the way people learned to read, or are due to habits formed at some time following the period of formal instruction. If this is true, it is equivalent to saying that slow reading is a bad habit. It

³⁸ M. D. Glock, "The Effect upon Eye-Movements and Reading Rate at the College Level of Three Methods of Training," *Journal of Educational Psychology*, 40 (1949), 93-106.

is likely that many persons learned to read at a needlessly slow rate. While this at present must be regarded as an inference, it may be asserted with considerable confidence, and with evidence to back it up, that most slow readers do not need to continue reading slowly.

Most educated people can learn to read at a rate now achieved by only the most facile 5 per cent.³⁹ The reader of this text may wonder, as some others have, what the sense is in reading fast if a person does not understand what he reads. This looks like a good question, except for the fact that it is better to read what one does not understand rapidly than to read it slowly. If a student requires four hours to "not understand" 50 pages and we can teach him to "not understand" the same 50 pages in one hour, we may say that we have helped him *somewhat*. Actually, and more seriously, we have helped him to a skill that should be useful to him as long as he lives—useful in reading whatever he can understand.

If months or even years were required to accomplish this result, its feasibility might be seriously questioned. Let us say for the present that by appropriate methods a group of freshmen drawn from the lowest half in reading rate can double their reading rate, double their mean rate score, within a few weeks' time. They can do this without appreciable loss, or gain, in comprehension.

This may lead only to more loafing, more "cokes," more recreation and social life, although these ends are important and probably would justify the means. But this improvement in basic reading skill may be put to work in the interest of getting a better academic education as well. Perhaps a case could be made for the statement that reading comprehension has been overemphasized. At the same time we can all agree that there is nothing connected with getting an education so important as reading comprehension. Did not the Apostle Paul make some complaint about the Corinthians' being too religious? Something of this kind is what we have in mind in the suggestion that reading compre-

³⁹ R. B. Ammons and A. N. Hieronymus, "Critical Evaluation of a College Program for Reading Improvement," *Journal of Educational Psychology*, 38 (1947), 449-70.

hension may be overemphasized. It is possible that the best way to approach it lies in not making too much of an issue of it. "Digging it out" by the sweat of the brow, digging it out whether or no, looking up all the unfamiliar words, underlining and learning key words and sentences, and so on, may not have the virtues sometimes claimed for them. On the other hand, wide, rapid reading, getting whatever one can, need not mean careless, slipshod habits of work and thought.

Let us take a hypothetical illustration: A is an adult citizen, a college graduate; he did not have any work in biology during his college days and now has little knowledge of the field; for one reason or another he develops some interest in genetics (it could be oceanography; or it could be marine life and a high-school boy instead of a man and genetics). A purchases some standard first book on genetics and reads it. It is safe to say that he is vastly better informed about the subject than before; that he understood a great deal of the book. It is also safe to say that there was a great deal he did not understand. If he is really interested in the subject, perhaps he is not satisfied with the result. He gets another book, let us say of about the same level of difficulty or advancement as the first. This time he seems to understand more; the book seems easier; many of the ideas, concepts, facts, problems, issues, seem somewhat familiar. The vocabulary is more familiar. Words that were vague at first now have more meaning. Perhaps in reading the first book he occasionally consulted a dictionary, but did this for the most part only after he had been unable to form any clear notion of a word's meaning after several encounters with it. Next let us have him read a third or a fourth book on genetics. Now he is really beginning to understand what he is reading. He has acquired what we may call the necessary background; he is acquainted with the technical vocabulary; he has learned something about the methodology of geneticists; he is beginning to know something about the frontiers of knowledge in the field, something of its applications, and so on. Let us bear in mind that a facile reader can cover these three or four books in the time B, a slow reader, needs to cover one. In our example there is little

of what we mean by "studying." We think A is much better informed than B about genetics; that any generalizations he might make afterward about the subject would be safer and sounder than if he had tried to dig it all out of the first book.

The writer has had some interest in the development of reading programs of the kind we are considering. It is not extravagant to say that a hundred or so letters have come to his office within the last three or four years—from colleges and universities, high schools, and large corporations—inquiring about reading and training programs. This is mentioned to indicate something of the phenomenal growth of this field in recent years.

Many high schools, in large cities, small cities, counties, have recently adopted programs of instruction in the basic skill in reading. They have, of course, maintained programs of instruction in developmental reading for a long time. Of the two kinds, the developmental programs are the more important by far. Basic-skill programs may be thought of as important supplements to the developmental programs. Reports indicate that instruction in the basic skill of reading has been on the whole quite successful in high school, though the outcome is more variable than in college. Obviously, it is somewhat difficult to motivate many high-school students to work at such an objective, especially those pursuing terminal curricula. With students following a college-preparatory curriculum, results have been obtained comparable with those achieved with college. Thus there is little doubt that such instruction can be effective at the high-school level.

In order to take full advantage of improved reading skill, a different type of instruction will be required. In our high schools today the textbook is all too often the principal or the sole basis of the assignment. Knowing that from one-fourth to one-half of the students cannot cover a great deal of ground, the instructor limits the assignments to a few pages a day, with the admonition to study each page carefully, to master it. This would not be too bad if the student could so master it. For the typical student, studying such an assignment carefully means learning statements made in the text, sometimes more or less verbatim, so that he can recite

them when called upon. At least this kind of an assignment encourages verbalism in learning. Many students, perhaps most of them, simply lack the background to master such an assignment. To do so they would have to read widely to enable them to bring to the assignment an adequate background of information.

If the English teachers, who usually give the instruction in reading, and the other instructors should league together to operate a different kind of school, we might expect a different result. The English teachers now undertake to develop reading skill to the extent that the typical student can read 40 to 60 pages in an hour, a fair-sized book within two or three evenings. Now let us suppose that other instructors begin to make use of this skill, begin to make assignments requiring wide reading, begin really using libraries as they can be used. There are many interesting books to be found on a wide variety of topics, books that on the whole are much easier to read than textbooks. It is not to be supposed that elaborately written reports are to be required. Rather it is supposed that the student will reveal the results of his reading by participating in discussion and development of topics under consideration and do so in his own words out of his own experience. It may be said that our American schools lack the books. This is doubtless true in many places, probably in most places. But as one of the writer's colleagues, Professor Ernest Horn, has often said, the schools would probably have them if we teachers were ourselves convinced that we had to have them to do an adequate professional job of teaching. It is presumed that these books will be readily accessible to the students, preferably in the classroom. In a certain third-grade classroom in a certain school known to the writer there are ninety odd sets of instructional material on the "pioneer unit," not counting duplicate copies. This sort of thing requires some kind of stability in the curriculum. An abundance of instructional material is not ordinarily built up quickly.

Instruction and materials. If the reader has been following the discussion of this section, he has probably been wondering about the nature of the instruction and that of the instructional materials. Let us discuss methods of instruction in connection with

certain materials. Several kinds of materials are usable, provided they meet certain conditions. There are reading films—motion-picture films: the Harvard Reading Training Films, primarily for use at the college level; and the Iowa Reading Training Films, primarily for use at the high-school level.⁴⁰ With both the last two sets of films there are supplementary reading materials (printed) and accompanying comprehension tests for both the films and the supplementary reading matter. The films and the motion-picture camera present phrases on a screen; the phrases, consisting of about three words each, are flashed for an instant on the screen, a period too short to permit more than a single fixation. The first phrase appears in the upper left-hand corner of the screen. It appears and disappears, followed by a second phrase and a third across the screen, as if across the page in reading. The next phrase is at the left again and down a line, and so on to the bottom of the screen. Then the reader goes back to the top and starts a new “page.” The student thus reads connected text across and down the “page,” time after time, to the end of the film. In addition to phrasing for the reader, the films also pace him, as the rate of presentation of phrases increases from film to film. At the faster rates, at least, it becomes difficult or impossible for the reader to verbalize, to say the words subvocally as he reads. (The Iowa Films go up to a rate of 447 words per minute. This is about the practical top of the Harvard Films.)

We have already seen that slow readers or even average readers make far too many fixations. The phrasing of the films is designed to overcome this. Word reading, as opposed to phrase reading, is usually accompanied by verbalizing or vocalizing, one of the most unfortunate habits of slow readers. Perhaps most readers do this to some extent, but it seems that a person should be able to read, as he listens, without any necessity for saying or repeating the words. Moreover, each of us sees, perceives, and reacts mean-

⁴⁰ The Harvard Films for the Improvement of Reading. (Cambridge: Harvard Films Service, Biological Laboratories, Harvard University); High School Reading Training Films and Supplementary Reading Materials (Iowa City: Bureau of Audio-Visual Instruction, State University of Iowa, 1951).

ingfully to hundreds of visual objects each day without the slightest compulsion to name them. Only in reading do we find this tendency, as we say or name visual objects, the words.

Let us note briefly now the steps in a typical day's instruction in a given program involving films. They are as follows, in order: (1) showing the film at a specified rate (the rate increases from day to day) and (2) giving the appropriate comprehension test; (3) having the students read the appropriate specimen of supplementary material (in pamphlet or booklet form and (4) taking the comprehension test. In addition, the students are required to practice speeded reading from 15 to 20 minutes per day, not longer, outside of class. The film rate is predetermined, and all members of the class read the film at the same rate. The rate of reading the supplementary material is not controlled, except insofar as it can be controlled by instruction. Each day the students are urged to read this material as rapidly as is possible with understanding. Each student plots on a graph daily his rate in words per minute.

The most essential elements in the program is probably effortful practice. This is why short practice periods are recommended. If the student tires, as he must in longer periods, he will have a tendency to revert to a slower and more comfortable rate. After the faster rate becomes habitual it is no more tiring than a slower rate. Effort requires motivation. Here the attempt is made to arrange conditions so that the student will practice reading in a different way. Mere practice, reading in the accustomed way, will only maintain the status quo. One learns by practice what he practices.

There are other devices for teaching speeded reading. The Reading Accelerator and the Reading Pacer may be mentioned. The former is a device for moving an opaque screen at various controlled rates down over the page from top to bottom, forcing the reader to keep ahead of it. The Pacer is the same in principle. Both are adapted to individual work, and they have proved to be quite successful.

One final mechanical device is to be noted, the tachistoscope.

This is a device for showing individual phrases, words, or other visual objects on a screen for predetermined periods of time. Most modern forms of this piece of apparatus make use of a picture projector and a shutter like that on a camera, which flashes words on other picturable objects on a screen. The older forms exposed the objects themselves. The essence of this device is the exposing of objects or pictured objects for brief and controllable periods of time. In the early grades it is sometimes used as a means of flashing words on a screen in word-recognition exercises. Several workers have used it in high-school and college reading programs as a means of giving practice designed to increase perceptual span and speed.

The writer and his associates have employed this engaging idea somewhat systematically in reading programs, but only in group work. In that case the student writes down the exposed phrases. At least, this is what they did in our experiments. This enabled us to compute measures of daily progress.⁴¹ In our experience the device was not very effective, not nearly so effective as any of the other methods we have tried. This may well have been due to the inefficient use we made of it. Writing the phrase after each exposure takes a good deal of time. Perhaps 50 phrases is about the limit that can be handled within a class period. With films or in practice situations with printed material, students can react up to 50 times this many phrases within the scope of a class period.

Moreover, none of these devices are at all necessary. Glock and others have shown that trained and competent teachers can obtain perfectly satisfactory results with printed materials—not with just any printed materials, but with materials for which exercises are available. A trained and competent teacher can of course improvise exercises.

The principal values in workbooks and reading manuals,

⁴¹ C. M. Freeburne, "The Influence of Training in Perceptual Span and Perceptual Speed upon Reading Ability," *Journal of Educational Psychology*, 40 (1949), 321-52. Cf. H. P. Smith and T. R. Tate, "The Improvements in Reading Rate and Comprehension of Subjects Training with the Tachistoscope," *Journal of Educational Psychology*, 44 (1953), 176-84.

supplementary reading booklets, comprehension tests, teacher's manuals, and the like are: (1) in group work they enable the instructor to put copies of instructional material into each student's hands, and (2), they enable the relatively inexperienced instructor to make a start.⁴² By following the directions, running the program as prescribed day by day and by keeping up interest, many teachers inexperienced in teaching reading have obtained good results.

Some Problems in Testing

A few final comments, mostly at the practical level, are on testing reading competency. It is not difficult to gain adequate measures of general reading proficiency, at least adequate for practical instructional purposes, by any one of several existing tests. Practically any of the better tests will sort out the good, average, and poor readers. This is not to suggest that all of these tests are equally good for all purposes; different tests attempt different things. How much this matters depends upon what the teacher is prepared to do with the results. Some tests include work skills, such as use of the library, of reference materials, of the index; interpretation of maps and graphs, interpretation of poetry, and the like.⁴³ These are all things taught in schools. Perhaps they belong in reading tests as well as anywhere. But if tests including these features, are used, it should be understood that the total or composite score will not be the same as that derived from a test that does not use these features. These features obviously have something to do with the efficient use of reading. They are reading skills in the sense that we use them in reading. But it is readily possible that a student could be an excellent reader so far as rate and comprehension are concerned and not have any competency

⁴² J. B. Stroud and R. B. Ammons, *Improvement of Reading Ability: A Manual for College Students* (New York: Appleton-Century-Crofts, 1949); J. I. Brown, *Efficient Reading* (Boston: D. C. Heath & Co., 1952); M. D. Glock, *The Improvement of Reading* (Boston: Houghton Mifflin Co., 1954).

⁴³ For example, H. A. Greene, A. N. Jorgensen, and V. H. Kelley, *Iowa Silent Reading Tests* (Yonkers: New ed. World Book Co., 1939).

in these utilization skills. It would also be possible for a student to become highly proficient in such skills and at the same time be a poor reader. This merely means that care must be taken in interpreting the scores on such tests.

Teachers can all agree that there are three basic things they need to know from the tests: general mental ability, reading rate, and comprehension. The best measure of general mental ability is, of course, an intelligence test. However, it is a common practice for authors of reading tests to include some measure of this kind. The most frequently used is a general vocabulary test. In addition, one test includes an analogies test and a general-information test.⁴⁴ The Durrell-Sullivan Reading Capacity Test, essentially a listening-picture-interpretation test, has had a long and useful history.⁴⁵ The *Primary Reading Profiles* have a feature of this kind.⁴⁶ Obviously, the function of such measures of general mental ability is to tell us whether or not a pupil is reading up to the level normal for his ability.

There are three or four ways of measuring reading rate in common use. One simply provides a reading selection of considerable length, several hundred words, with instructions to read it as rapidly as can be done with understanding. The examiner can determine the time each student requires to complete the task. A comprehension test follows. Or the test designer may instruct the examiner to call time at the end of some specified period, say five minutes, or less, and request the students to mark the line being read at that time. Since comprehension tests usually follow, the students are instructed to go ahead and complete the reading of the selection. By either procedure a rate score can be computed. One method is about as good as the other. Since the second is

⁴⁴ M. J. Van Wagenen and A. Dvorak, *Van Wagenen-Dvorak Diagnostic Examination of Silent Reading Abilities* (Minneapolis: Educational Test Bureau, 1939).

⁴⁵ D. D. Durrell and H. B. Sullivan, *Reading Capacity and Achievement Tests* (Yonkers: World Book Co., 1937).

⁴⁶ J. B. Stroud and A. N. Hieronymus, *Primary Reading Profiles* (Boston: Houghton Mifflin Co., 1953).

much more convenient, it is usually used. Several tests require the student to do something as he goes along to show that he has understood what he read. He may be required to mark incongruent words or sentences, or to answer interspersed questions as he reads. On the face of it this looks like an improvement, because it gives assurance that the passages are actually read. However, there is one difficulty: what to do with the wrong responses. If the total number of responses made is counted as the score, nothing is gained by the method. If only the correct responses are counted, or, worse still, right minus wrong, an erroneous picture of rate is given. A student who tries 30 exercises and gets 10 wrong reads at the same rate as one who tries 30 and gets none wrong. But if we count only the right or score the papers $R - W$ or some fraction of W , we get quite different rate scores.

One of the serious problems in measuring reading comprehension is to obtain a comprehension score that is independent of rate. The seriousness of this can be seen in the fact that up until some ten years ago textbooks in psychology and education almost without exception maintained that fast readers enjoy much better comprehension than slow readers. Correlations obtained between rate scores and comprehension showed this, with a coefficient on the order of .50. This comes about from the fact that the comprehension subtests for most reading tests are strictly timed. The comprehension score is the number of items answered correctly on a reading test in a given length of time. Since fast readers read with comprehension equal to (but little better than) that of slow readers, they naturally make higher comprehension scores. The correlations thus obtained were largely spurious.

Two methods of obviating this difficulty are to be noted. One is illustrated in the Pressey test, Reading Speed and Comprehension.⁴⁷ Here the student reads a rather long selection of about 2500 words. On this, his rate is determined by having him mark the line he is reading when time is called. He finishes the selection,

⁴⁷ S. L. Pressey, *Reading Speed and Comprehension* (Ohio State Department of Education, 1935).

lays it aside, and takes an untimed comprehension test covering the entire selection. Another method is utilized in the co-operative tests, in what is termed "level-of-comprehension score."⁴⁸ As originally conceived, the test consisted in effect of three comparable scales of 30 items each. The level-of-comprehension score is the average score achieved on the scales completed. If A completed Scale 1 with a score of 25, B, Scales 1 and 2 with an average score of 25, and C, Scales 1, 2, and 3 with an average score of 25, all three readers could be said to have achieved the same level of comprehension, though differing markedly in rate.

Is further diagnosis useful? Several authors of reading tests have made a point of diagnostic features in them. For example, the Van Wagenen-Dvorak tests provide five separate comprehension scores: ability: (1) to generalize, (2) to draw inferences, (3) to note and remember clearly stated detail, (4) to draw conclusions, and (5) to combine ideas that belong together in thought but are not presented together. These are abilities that a good comprehension test should try to get at, if for no other reason than that of making efficient use of the reading text. One could not draw many inferences from a short reading selection; but there are other kinds of questions that can be asked about it.

Such attempts at diagnosis have not panned out very well. This is not to say that the tests are still not perfectly good for the purpose of ranking pupils in reading ability. For example, the Van Wagenen-Dvorak tests are certainly excellent reading tests. The value of their diagnostic features would seem to rest on two things: first, are there enough differences in comprehending abilities to make such an approach feasible? Would the examiner be just as well off if he thought in terms of the total score? Are there students who can draw conclusions but who cannot draw inferences or generalize? This seems doubtful. Second, are we teachers prepared to do anything about these differential scores in our instruction, if differences exist in significant amounts? Are we

⁴⁸ *Test C1: Reading Comprehension (Lower Level), and C2 (Higher Level)* (Princeton: Educational Testing Services), n.d.

able to teach one independently of the others; or should we do so if we could?

This evaluation of diagnostic testing does not quite hold for the beginning stages of learning to read. In reading readiness work and perhaps throughout the primary grades when the conditions stipulated in the preceding paragraph are met—uneven development and differential instruction—diagnostic testing has proved to be of considerable worth. Visual discrimination, auditory discrimination, sight word recognition, ability to construe untaught words from contextual clues, are among the reading skills for which specific instructional materials and methods are available.

Rate and Comprehension

In the preceding pages the suggestion is offered that reading rate and reading comprehension are virtually independent variables. This interpretation is advanced in the light of a particular conceptualization of the problem; namely, that rate performance constitute one of the two measures and comprehension performance the other, with the stipulation, which is the crux of the matter, that the two kinds of performance be kept operationally independent one of the other.

Let us suppose an investigator has each of a random sample of tenth-grade students, for example, read a selection under a given set of instructions, such as "Read at your normal rate," or "Read as rapidly as you can and yet comprehend what you have read." When this has been done and the rate score for each student has been recorded, we set about by questioning, or by some other means, to determine how well each student comprehended what he read. The most efficient way to do this would be to administer a previously prepared comprehension test. If we wish this measure to be independent of reading rate—which must be our objective if we are trying to determine the relationship between two independent variables—the students must have unlimited time to read, ponder, and mark the questions. When these conditions are

met, reading rate and comprehension should correlate to a low degree, if at all.⁴⁹

Any procedure that mixes rate performance with comprehension performance, such as requiring the student to show evidence of comprehension on his rate performance by answering questions or marking something as he goes along, should show a positive correlation. Likewise, any timed procedure of measuring comprehension that puts a premium upon reading the questions quickly, thinking quickly, and marking the answers quickly should show a positive correlation between rate performance and comprehension performance. In general, the magnitude of the correlation coefficient should be a function of the extent to which rate and comprehension measures encroach one upon the other.

Thus it should be possible to set up an experimental problem on the rate-comprehension issue in several different ways. The amount of relationship obtained will, it is suggested, be found to vary with the method of attack.

Typography and Illumination

Size of type. It has been shown that visibility bears a relationship to type size. Luckiesh and Moss found that 6-point type (Bodoni Book) gave 27 per cent of maximum visibility; 8-point, 43 per cent; 10-point, 56; 12-point, 63; 14-point, 68; 16-point, 73; 18-point, 76 . . . 24-point, 83, by a given method of reckoning and with 10 footcandle illumination.⁵⁰ It should not be supposed, however, that these differences in visibility are attended with corresponding changes in legibility. Paterson and Tinker report that for 19-pica line length there is relatively little difference in legibility of reading matter set (solid) in sizes varying from 8-point to 12-point, the range commonly used in printing. The

⁴⁹ J. B. Stroud, "A Critical Note on Reading," *Psychological Bulletin*, 39 (1942), 173-78; *Idem.* and M. C. Henderson, "Rate of Reading and Learning by Reading," *Journal of Educational Psychology*, 34 (1943), 193-205.

⁵⁰ M. Luckiesh and F. K. Moss, "The Quantitative Relationship between Visibility and Type-size," *Journal of the Franklin Institute*, 227 (1939), 87-97.

criterion of legibility was speed of reading. Thus it is indicated that one does not require anything like maximum visibility for purposes of reading.⁵¹

There is, however, the possibility that visibility is somewhat more closely associated with what we may call comfortableness, as indicated by a minimum of strain or fatigue. In fact, Luckiesh believes this to be the case. Paterson and Tinker found the greatest preference, as indicated by statements of opinion, to be for 11-point type, 10- and 12-point ranking next, then 9- and 8-point next, in that order. In reading newspaper headlines tachistoscopically exposed, English could find no significant differences in legibility among 14-, 24-, and 30-point sizes.⁵²

Kinds of type. Paterson and Tinker found the book type faces in common use to be equally legible. However, they vary in visibility, as reported by Luckiesh. They did, however, find that the reading of American typewriter type was slower by about 5 per cent than book type. The reading of material set in all capitals was found to be slower than material set in lower case by 12 per cent. Readers expressed a decided preference for lower case, as determined by subjective judgments. Boldface and lightface type are read with equal facility, although readers express a preference for lightface.⁵³ Boldface can be seen farther.

Line length. Paterson and Tinker report that for 10-point type set solid, lines varying from 17 to 28 picas are equally legible; while 10-point type with a 2-point leading is read equally well in lines ranging from 14 to 31 picas. Lines varying from 17 to 41 picas are equally legible when set in 12-point, set solid or with 2-point leading. Lines varying from 13 to 25 picas can be read equally well when set solid in 8-point type; when set with a 2-point leading the range of equality is from 13 to 36 picas.

Again the question of fatigue is raised. Luckiesh finds that

⁵¹ D. G. Paterson and M. A. Tinker, *How to Make Type Readable*, Chap. III (New York: Harper and Brothers), 1940.

⁵² E. English, "A Study of the Readability of Four Newspaper Headline Types," *Journalism Quarterly*, 21 (1944), No. 3, 217-29.

⁵³ *Op. cit.*

greater lengths, especially with smaller type face, are more conducive to fatigue, as measured by the blink technique.⁵⁴

Illumination. Tinker reports that for two minutes' adaptation to each intensity of light used, intensities below 10.3 footcandles retarded speed of reading. (The intensities used were 0.1, 0.7, 3.1, 10.3, 17.4, and 53.3 in footcandles.) With fifteen minutes' adaptation, reading under the intensities of from 3.1 to 53.3 was equally fast. The reading matter was set in 10-point type. The critical point for 10- to 12-point type, Tinker suggests, is 3 to 4 footcandles. In order to provide a margin of safety he suggests an intensity of from 10 to 15 footcandles for ordinary conditions, with 20 to 25 footcandles for work requiring finer discrimination.⁵⁵ However, when subjects are allowed to choose the illumination under which they prefer to read, the intensity runs considerably higher, the average being about 42 footcandles. Individual preferences ranged from 10 to 84.⁵⁶ Tinker finds that fatigue incident to continuous reading for two hours, as measured by the "li" test, is not lessened by the use of higher intensities, above the critical point. However, Luckiesh and Moss found a decrease in nervous muscular tension with increased illumination up to 100 footcandles.⁵⁷ Apparently different methods of measuring fatigableness give different results.

ADDITIONAL REFERENCES

Artley, A. S., "Oral Language Growth and Reading Ability," *Elementary School Journal*, 53 (1953), 321-28

⁵⁴ M. Luckiesh, *Reading as a Visual Task* (New York: Van Nostrand Co., 1942).

⁵⁵ M. A. Tinker, "The Effect of Illumination Intensities upon Speed of Perception and upon Fatigue in Reading," *Journal of Educational Psychology*, 30 (1939), 561-71.

⁵⁶ M. A. Tinker, "Illumination Intensities Preferred for Reading with Direct Lighting," *American Journal of Optometry and Archives of American Academy of Optometry*, 21 (1944), 213-19.

⁵⁷ M. Luckiesh and F. K. Moss, "A Correlation between Illumination Intensity and Nervous Muscular Tension Resulting from Visual Effort," *Journal of Experimental Psychology*, 16 (1933), 540-55.

- Barry, R. F., and Smith, P. E., "An Experiment in Ninth-grade Reading Improvement," *Journal of Educational Psychology*, 45 (1954), 407-14
- Boyd, G., and Schwiering, O. C., "Remedial Instruction and Case Records: A Survey of Reading Clinic Practices, II," *Journal of Educational Research*, 44 (1951), 443-55
- Carrillo, L. W., and Sheldon, W. D., "The Flexibility of Reading Rate," *Journal of Educational Psychology*, 43 (1952), 299-305
- Coleman, J. C., "Perceptual Retardation in Reading Disability Cases," *Journal of Educational Psychology*, 44 (1953), 497-503
- Dahlberg, C. C., Roswell, F., and Chall, J., "Psychotherapeutic Principles as Applied to Remedial Reading," *Elementary School Journal*, 53 (1952), 211-17
- Eames, T. H., "The Relationship of Reading and Speech Difficulties," *Journal of Educational Psychology*, 41 (1950), 51-55
- Edson, W. H., Bond, C. L., and Cook, W. W., "Relationships between Visual Characteristics and Specific Silent Reading Abilities," *Journal of Educational Research*, 46 (1953), 451-57
- Fea, H. R., "Interrelationships among Materials Read, Written and Spoken By Pupils of the Fifth and Sixth Grades," *Journal of Educational Psychology*, 44 (1953), 159-75
- Gray, W. S., *Preliminary Survey on Methods of Teaching Reading and Writing*, UNESCO Educational Studies and Documents No. 5 (Paris: Education Clearing House, 1953)
- Hunt, J. T., "The Relation among Vocabulary, Structural Analysis, and Reading," *Journal of Educational Psychology*, 44 (1953), 193-202
- Johnson, G. B., "A Comparison of Two Techniques for the Improvement of Reading Skills at the College Level," *Journal of Educational Research*, 46 (1952), 193-205
- Krise, M., "An Experimental Investigation of Theories of Reversals in Reading," *Journal of Educational Psychology*, 43 (1952), 408-22
- McGinnis, D. J., "Corrective Reading: A Means of Increasing Scholastic Attainment at the College Level," *Journal of Educational Psychology*, 42 (1951), 165-72
- Mintz, A., "Reading Reversals and Lateral Preferences in a Group of Intellectually Subnormal Boys," *Journal of Educational Psychology*, 37 (1946), 487-501
- New York University, Bureau of Secondary Curriculum Development, *Road to Better Reading*. (Albany: New York University Press, 1953)

- Osburn, W. J., "Emotional Blocks in Reading," *Elementary School Journal*, 52 (1951), 23-30
- Pitts, R. J., "Relationship between Functional Competence in Mathematics and Reading Grade Level, Mental Ability and Age," *Journal of Educational Psychology*, 43 (1952), 486-92
- Reynolds, M. C., "A Study of the Relationships between Auditory Characteristics and Specific Silent Reading Abilities," *Journal of Educational Research*, 46 (1953), 439-49
- Richmond, E. V., "Program for Remedial Reading," *Elementary School Journal*, 54 (1954), 291-95
- Rose, F. C., and Rostas, S. M., "The Effect of Illumination on Reading Rate and Comprehension of College Students," *Journal of Educational Psychology*, 37 (1946), 279-92
- Sheldon, W. D., and Cutts, W. C., "Relation of Parents, Home and Certain Developmental Characteristics to Children's Reading Ability, II," *Elementary School Journal*, 53 (1953), 517-21
- Smith, H. P., and Tate, T. R., "Improvements in Reading Rate and Comprehension of Subjects Training with the Tachistoscope," *Journal of Educational Psychology*, 44 (1953), 176-84
- Tinker, M. A., "Effect of Slanted Text upon the Readability of Print," *Journal of Educational Psychology*, 45 (1954), 287-92
- , "Fixation Pause Duration in Reading," *Journal of Educational Research*, 44 (1951), 471-79
- , "Readability of Book Print and Newsprint in Terms of Blink-Rate," *Journal of Educational Psychology*, 39 (1948), 35-39
- UNESCO, *Progress of Literacy in Various Countries*, Monographs on Fundamental Education No. 6, 1953
- Weber, C. O., "Reading Inadequacy as Habit," *Journal of Educational Psychology*, 40 (1949), 427-33
- Wheeler, L. R. and V. D., "A Study of the Relationship of Auditory Discrimination to Silent Reading Abilities," *Journal of Educational Research*, 48 (1954), 103-13
- Witty, P., and Brink, W., "Remedial Reading Practices in the Secondary School," *Journal of Educational Psychology*, 40 (1949), 193-205

VI

LANGUAGE AND COMMUNICATION

THE EARLIEST SURVIVING SPECIMENS of man's writing date back to something like 6000 years. We have no knowledge of his language in more remote periods in his history beyond what we may be able to infer from contemporary primitive tribes. We may be fairly certain, however, that man has had some command of language practically from the beginning of his existence. The use of fire, the shaping of tools, the practice of religious rites, as well as work in art—these all require thought, and thought requires language. The fine paintings and carvings of long-extinct animals on the walls of caves and on tools, together with strewn litter of skeletons and an occasional implement, argue that these practices are very, very old. (In a certain camp in Moravia there were found more than 2000 mammoth vertebrae and in another, some 60 skeletons; at another, 20 human bodies were found in a tomb comprised of shoulder blades of mammoths—long since buried under glacial till.)¹

Animals are capable of making natural responses to various environmental circumstances. In most of the higher forms of animals certain of these natural responses produce effects upon the behavior of their fellows. Distress cries, sex calls, feeding behavior, emotional reactions of various kinds, are some of the natural responses that come to mind. Intelligent beings, such as primitive

¹ Fay Cooper Cole, *The Long Road from Savagery to Civilization* (Baltimore: Williams and Wilkins Co., 1933).

man, could hardly fail to observe the effects of these natural responses upon others and ultimately to make them in order to produce these effects, much as a ten-month-old infant seems to do. These purposeful responses then become natural *signs*, and therefore language symbols. Once sounds, manual gestures, and facial expressions became established as signs (assuming that they did), it would have been a fairly easy step to the employment of conventional or arbitrary signs.²

The foregoing suggests that communication is a sensory-motor process. It is accomplished by means of the motor reactions of the signmaker—speaker, writer, or other—and the sensory apparatus of the observer. We can never know what another is thinking except as he reveals this to us by word, gesture, or other action. He cannot make his action known to us except through our sense organs.

Language is a poor thing. You fill your lungs with wind and shake a little slit in your throat, and make mouths, and that shakes the air; and the air shakes a pair of little drums in my head—a very complicated arrangement, with lots of bones behind—and my brain seizes your meaning in the rough. What a round-about way, and what a waste of time!—Du Maurier³

Natural and conventional signs alike depend upon a common experience. While the making of the gestures and the uttering of the sounds did not originally depend upon learning but were made as natural responses to situations, their becoming *signs* did depend upon learning common to the originator and to the observer. This is what Mead meant by saying that to become a sign a response must be *significant* and must *indicate*—must be significant to the person who makes it and must indicate something to the observer. Really, it must indicate the same thing to the observer that it signifies to the originator.

² F. M. Mueller, *The Science of Thought: Three Introductory Lectures* (Chicago: The Open Court Publishing Co., 1887), pp. 26 ff.

³ Quoted from G. A. Miller, *Language and Communication* (New York: McGraw-Hill Book Co., 1951), p. 10.

Conventional signs differ from natural ones only in that their meaning is, or may be, entirely arbitrary. Any response that man can make may become a sign of anything so long as it comes to be accepted as a standard symbol of that thing. But this is not to suggest that words are invented in an arbitrary way. Mueller has shown the enormous quantity of words in the Aryan family of languages that have stemmed from various primitive roots. Let us take as an example the root *pas*, meaning to tether or bind. In Sanskrit this root is used in *pasu*, cattle; in Latin in *pecus*, cattle, *pecunia* and *pecus*, (lawyer's) fee; from *pecus* we get *peculium*, private property, and *peculiaris*, peculiar—that which is one's own; *pax*, peace, *pacare*, to pacify, then to pay and payment, and so on. In Greek this root supplies the concept to make fast and also to stand fast, *πέπηγα* (I stand fast); from made fast we get the concepts solid, strong, well put together, *πηγός*; hill or mound, *παγός*; and similarly for dozens of other words, such as cage, net, trap, catch, boat, scaffold, scum, salt, milk, firm, thick, stout, and peg. This root *pas* has a comparable history in the Germanic tongues and in the other members of the Aryan family.

All this is only meant to give . . . an idea of the enormous variety of thought that can be traced back [to], and [which] . . . took its rise from, one single root such as *PAS*, to tether. Whether we speak of *peculiar* people or of *peace* of mind, of *pagans* or of the *propagation* of the Gospel, of a *page* of writing or of the *Areopagus*, of *Gefängniss*, prison, or of *ein empfängliches Herz*, a susceptible heart, we do it all by means of one and the same primary concept,—*PAS*, to tether.⁴

Something about the origin of words is also to be found in what have been called “loan words.” Were all history lost save that of the languages of the world, past and present, the history of man could be rewritten in broad outline from philological history. For example the “loan words,” which Jespersen likens to the mile-stones of history—not only of linguistic but of general history—give some indication of the mutual influence of nation upon nation. By them we can learn when and in what respect the history

⁴ Mueller, *op. cit.*, p. 40.

of a people was influenced by another, and by whom. Likewise it is possible to ascertain whether and to what extent the influence was reciprocal. "If all other sources of information were closed, we should still have no hesitation in inferring from such loan words in our modern North European languages as *piano*, *so-prano*, *libretto*, *tempo*, *adagio* and numerous others that Italian music has played a great role all over Europe."⁵

Like civilization itself, and man himself, language appears to have come out of the East. With the exception of Chinese and Japanese, the languages of most important countries belong to a single family, the Aryan (Indo-European). Languages so different ostensibly as Sanskrit, Armenian, Greek, Latin, the modern Romance languages, Germanic (including English and Scandinavian), Balto-Slavic, and every tongue in Europe except Basque, Finnish and Hungarian (the latter two belonging to the Ural-Altaic, as does the Turkish) are all members of this great family. Other great linguistic families are the Semitic (including Arabic, Hebraic, Abyssinian, Phoenician, and Syrian), the Chinese or Southeastern Asiatic, and the Bantu or South African.

Of the origin and early development of the so-called parent Aryan stock little is known. Sanskrit was at the beginning of its extant history already a highly complex and fully developed language. The bringing of Sanskrit, the ancient sacred and literary language of India, to the ken of scholars of Europe in the latter half of the eighteenth century represents one of the truly important events in the study of language. Its tremendous value lies in part in the fact that it had been for so many centuries a "dead" language and therefore had escaped the numerous changes that take place in an active language. Consequently, Sanskrit is one of our best examples of old Aryan. This event marked the beginning of numerous successful philological investigations of the development of other important Aryan languages—Greek, Latin, German, English, Russian, and the rest. Up to the time these investigations began to bear fruit it was not fully appreciated that these lan-

⁵ O. Jespersen, *Growth and Structure of the English Language* (Leipzig: B. G. Teubner, 1905), p. 30.

guages, ostensibly so different, belong to the same family; and indeed present so many common characteristics, when the lawful character of the changes is understood, that there could be no room for reasonable doubt as to their kinship.

Of the phonetic changes, two especially have operated to make words appear so different; namely, *consonant shift* and *stress shift*. To the beginning student of Latin the words *pater* and *father* appear to be different enough. When certain consonant shifts are pointed out—such as that any *p* becomes *f* and any *t*, *th*—the formal identity of the two words is seen. Likewise, when it is appreciated that any Latin *k* changes to English *h*, the similarity between *cornu* and *horn* becomes apparent.⁶ Further illustrations are the following:⁷

Sanskrit	Greek	Latin	English	Russian
<i>bhrāta</i>	<i>phrāter</i>	<i>frāter</i>	<i>brother</i>	<i>brat</i>
<i>pitā</i>	<i>patēr</i>	<i>pater</i>	<i>father</i>	....

Language Development

All peoples everywhere have an articulate language that is more or less adequate for their existing needs. In terms of the earlier suggestion regarding the origin of language, it is reasonable to suppose that speech and gesture developed simultaneously. Both continue to some extent to the present, although nearly all the higher developments and refinements have occurred in speech. These include inflection, the rich vocabularies and sentence complexity, and the standardized uses of syntax which characterize the languages of civilized people. There are many obvious advantages in a language based upon sound production and reception. An individual can communicate at night, or with another whose back is turned, or with one on the opposite side of the hill; he can communicate when his hands are otherwise em-

⁶ Examples taken from Jespersen, *op. cit.*, p. 22.

⁷ W. B. Pillsbury and C. L. Meader, *The Psychology of Language* (New York: D. Appleton-Century Co., 1928), p. 211.

ployed. The point is frequently made that primitive peoples make relatively greater use of gesture than do peoples who use one of the highly developed languages.

Learning to speak is a highly complex process. In the first place, one must gain control over organs and processes that are used only secondarily for the production of speech sounds. The primary function of these organs and processes has to do with such vegetative activities as breathing, sucking, chewing, and swallowing.

Required for the production of sound are a source of energy and a vibrating body, and for the production of sounds of varied quality, resonators. In speech, the stream of breath provides the physical energy; the vocal folds, the vibrating body; and the cavities of the throat, mouth, and nasal passage, the resonators. Something of the complexity of speech production may be seen by comparing records of continuous respiratory activity during passive breathing and breathing during speech. The time during which air is taken in, in the total respiratory cycle, is represented by I; the total time of the cycle, by D. The *I fraction* is the ratio of I to D. According to Miller, the I fraction varies on the average from .40 to .45 during passive breathing, but is only about .16 during speech.⁸ Thus during speech air is taken in quickly, .16 of the cycle being devoted to inspirations, the remainder of the time, more or less, to expiration. In speech the air is emitted slowly and in controlled ways. The portions of the respiratory curves showing expiration during speaking activity exhibit small individual pulsations, corresponding to the syllables spoken. Abdominal and chest muscles force the air out through the vocal folds of the larynx. The contraction of these muscles begins just before the utterance of the first syllable, and continues during expiration with somewhat heightened strokes or bursts (of chest muscles) as each syllable is spoken. At the end of the expiratory movement the speaker fills his lungs again by a quick intake of air—during which no speech sounds are made, with perhaps the exception of a language or so in Africa.

⁸ *Op. cit.*, p. 11.

Control of the breath stream is only one aspect of learning to talk. The small child must learn to make sounds at will; must learn to make most of the sounds he will require in speech; and he must learn how to combine them. The human infant can make six or seven sounds so early in life that we may assume he does not learn these. This assumption is supported by the fact that deaf infants, who probably could not have learned them, can also make these sounds. We may also infer that the individual child actually learns to make the other sounds he will require in speech—the phonemes—from the fact that the deaf child never exceeds by very much the infantile sounds that can be made soon after birth.⁹ In continuous speech the manner of functioning of the various organs that contribute to the speech sounds is influenced by the preceding and the succeeding sounds. English speech employs about 42 different sounds; that is, significant sounds or phonemes. A speaker may utter irrelevant sounds and make noises, which we learn to ignore for the most part. The latter fact may cause a phonetician a good deal of trouble in the initial stages of transcribing the speech sounds of a strange language.

Now we come to the organs of articulation, by which the shape of the path through which the air passes from the larynx to and through the mouth is regulated. In speech, these are the vocal folds, the hard and soft palates, tongue, teeth, lips, and jaw. Vowel sounds are classified according to: (1) the part of the tongue involved, (2) the height of the tongue, and (3) the shape of the lips, as rounded or unrounded. According to Miller, three tongue parts (front, middle, and back), seven tongue heights, and two lip positions are recognized ($3 \times 7 \times 2 = 42$). There are four chief types of articulation, as far as consonants are concerned: (1) *plosives* or *stops*, where the breath stream is stopped, as in the *p* in *pop*; (2) *fricatives* or *spirants*, produced by forming

⁹ In an investigation of deaf-born children Carr found that by five years of age the production of vowel and consonant sounds of their group had not exceeded the production of hearing children one year old. (J. Carr, "An Investigation of the Spontaneous Speech Sounds of Five-Year-Old Deaf-Born Children," *Journal of Speech and Hearing Disorders*, 18 (1953), 22-29.

a narrow slit for the air passage, as in *th* in *thin*; (3) *laterals*, in which the air passes around the sides of the tongue, as in *l* in *let*; (4) *trills*, in which one of the articulators vibrates—rare in English speech. Sometimes a fifth type is added, *nasals*, as in the final sound in *rum*.¹⁰

This brief account of the production of speech sounds should serve to point up the complexity of the learning tasks involved. One is tempted to think that a young child could not possibly learn to speak. And this is of course only a small part of what is involved in mastering a language. The main task is learning the meanings of the words and their syntactical relationships. Long before the child begins to talk he has engaged in a great deal of "vocal play," and has heard and learned to recognize some of the speech sounds made by others. Various writers have suggested that inasmuch as the child hears the sounds he makes, and as a result should form associations between his self-initiated auditory stimuli and the responses necessary to their production, something of the nature of circular reflexes should be established. If and when these connections are established, the making of a sound should provide a stimulus for making it again. At least this accords with the fact that young children at this stage frequently indulge in repetitive production of sounds. Later, sounds made by others may lead to the child's making the appropriate responses, at least those in his repertory.

The psychology of speech learning. At this point let us take a quick look at the conditions essential to learning, as currently conceived by association psychology. In the case of learning to make speech sounds we assume that the child must be able to perceive the stimuli; that is, he must be able to hear them and to discriminate them from other auditory stimuli. He must perceive each stimulus as some kind of unique entity. It is also assumed that in order to learn a response it must be made, repeated. But it is not enough that it be repeated; if it is to be learned, it must also be reinforced, rewarded. It can be reinforced only by satisfying some motivating condition.

¹⁰ From Miller, *op. cit.*, pp. 17-19.

In the early stages of learning to talk we recognize two kinds of responses. The first, the *naming response*, is not a language response. It is merely a speech response; no symbolism is involved. It differs from a reaching or pointing response only in that speech muscles are involved instead of hand and arm muscles. Approval and recognition by parents could provide the rewarding element in the situation. The second and ensuing kind of speech response to appear in the early stages is what has been called a *demanding response*. It is probably a response to an internal stimulus. This is symbolical; it is a sign, and thus qualifies as a language response, as a word is used to stand for something—water or bottle, for example. Here there is a possibility of two sources of reinforcement: first, social approval, which by this time the child is already quite conscious of; and second, the satisfaction of having the demand met—with food, water, or whatever. By virtue of reinforcing a speech response to one cue (stimulus or stimulus pattern) and not to others, and by reinforcing correct or appropriate speech responses and not incorrect or inappropriate ones, the child learns to make correct speech responses.

Pretty soon the typical child shows a proclivity for speaking that seems to transcend his need for social approval and the demand needs he started out with. The drive to speaking appears to be self-sustaining; at least, inward drives that have little to do directly with social approval or the satisfaction of bodily needs seem to come into the picture. Such a child may talk when alone or when no one is listening, or about things that seem to have nothing to do with the satisfaction of his primary needs.

A drive has a stimulus value. At the outset in life only a few stimuli—hunger, pain, and so on—have drive value. Thus there are drive and nondrive stimuli. In the course of development many stimuli take on drive value. When a response to a stimulus is repeatedly reinforced, it tends to acquire drive value. A striking example of this is an experiment with chimpanzees and poker chips. In the experiment in question the animals were put in a situation in which they could obtain food by manipulating poker chips in a certain way—inserting them in a piece of apparatus re-

sembling a slot machine. In time these animals displayed a lively interest in these tokens, to the extent of hoarding them. That they had acquired drive value is further attested by the fact that they could be used subsequently as goal objects (substitutes for food, for example) in other learning situations. If the assumption that reinforcement is an essential condition to learning is correct, we may say that this newly acquired secondary drive provided the reinforcement for learning in another situation.¹¹ Our own responses to money have been repeatedly reinforced in so many ways—satisfaction of needs for necessities and comforts of life, security against anticipated adversity, aspirations for the welfare of our children, needs for recognition and prestige—that money has become one of the most highly generalized drives of civilized man. We see people acquiring, conserving, and hoarding it to a degree far exceeding any practical usefulness.

Generalization of this kind may be observed in many fields of behavior. Generalization is a basic and pervasive psychological phenomenon. A person who has repeatedly experienced defeat or failure in one, or at most a very few, situations may come to display behavior symptomatic of feelings of inferiority in a great variety of situations. It is reasonable to assume that generalization of this kind takes place in speech behavior. As speech responses are continually reinforced there should logically follow a degree of stimulus generalization sufficient to ensure a highly general demand for speech output. As powers of speech develop, new sources of reinforcement of speech behavior and speech learning appear. Speech becomes a means of eliciting responses from others, and a means of responding to others—a highly satisfying medium of social interaction. Moreover, a person finds that he can often enhance his prestige by learning to speak correctly and effectively.

What all this is meant to suggest is that contemporary associa-

¹¹ J. B. Wolfe, "Effectiveness of Token Rewards for Chimpanzees," *Comparative Psychology Monographs*, 12 (1936), No. 60; J. T. Cowles, "Food Tokens as Incentives for Learning by Chimpanzees," *Comparative Psychology Monographs*, 14 (1937), No. 5.

tion psychology provides a theoretical framework for the development of speech and language behavior. Since people, and for that matter primates, are abundantly endowed with the requisite sensory and motor equipment for speech, the main task has been to outline the drives necessary to provide the motivation and the reinforcement for speech learning.

Development of speech sounds. Figures 2 and 3 show the development of speech sounds by phonemic type and phonemic frequency, respectively, for a sample of 95 infants. The unit of time was 30 consecutive breath cycles in which speech sound was produced. This is a longitudinal study extending from 1 to 30 months in the lives of these young children. Thirty monthly

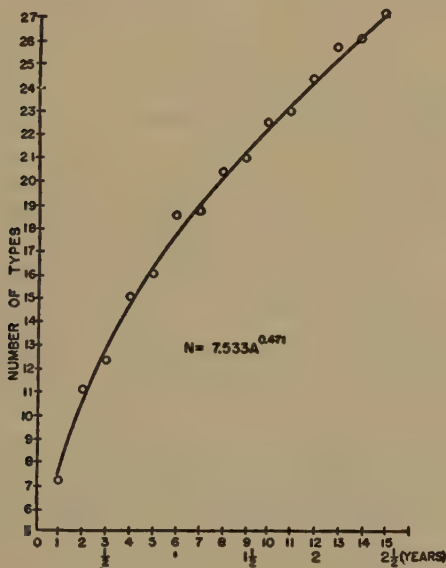


Fig. 2. Curve showing the course of development of phoneme types during the first two and a half years of life. (Reprinted with permission of the American Psychological Association and the *Journal of Experimental Psychology*.)

samples were taken for each infant.¹² We see from Figure 2 that the average baby at the first period, 1 to 2 months, produced about seven phonemes; at the fifteenth period, 29 to 30 months, the average child of this group had mastered about 27. Likewise, we see from Figure 3 that at the first period the seven phonemes were vocalized about 63 times; while at the fifteenth period, the

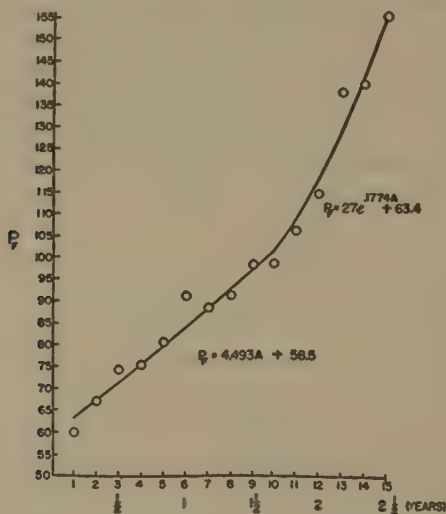


Fig. 3. Curve showing the course of development of phoneme frequencies during the first two and a half years of life. (Reprinted with permission of the American Psychological Association and the *Journal of Experimental Psychology*.)

27 phonemes were vocalized about 155 times. We may also observe that the two curves are different in shape. The curve in Figure 2 is what we call a negatively accelerating curve; that in Figure 3, an accelerating, or, as is sometimes said, a positively accelerating one. Thus we may say that while the baby increases his mastery over different sound elements at a decreasing rate,

¹² C. Irwin, "Speech Development in the Young Child: 2. Some Factors Related to the Speech Development of the Infant and Young Child." *Journal of Speech and Hearing Disorders*, 17 (1952), 269-79.

his frequency of sound production increases at an increasing rate.

In the article just cited Irwin brings together a number of his previous investigations as well as those of others which provide interesting information on a number of additional factors associated with speech development. We may wonder, for example, if rate of development of speech sounds is associated with the development of intelligence. The answer seems to be Yes. At least there is supporting evidence for this answer for the age range of 20 to 30 months. Irwin's report shows a median correlation coefficient of about .45 (24 coefficients reported) between various speech-sound indices and scores earned on two intelligence tests, chronological age being held constant, more or less.¹³ Below the 20-month level results so far are variable and indecisive. This may be a function of the nature of speech-sound development at this period or one of deficiencies of our intelligence tests at this age level.

From various workers with orphanage children the writer has gained the impression that such children are seriously retarded in speech development. This retardation has generally been attributed to limited speech stimulation. Irwin reports comparisons in speech development between 90 orphanage babies during the first 6 months of life and that of a sample of home babies. The average for orphanage babies for the first 2 months was about 6.5 phonemic types; for the 3- to 4-month period, 8—; and for the 5- to 6-month period, 8+. For home babies of the same periods the averages were approximately 7, 11, and 13. Large differences were also obtained between the two groups of babies on phonemic frequencies.¹⁴ It is interesting that these differences should show up in the production of isolated speech sound and at such an early age. Similar differences were obtained, but at later ages—from about one to two-and-a-half years—between children of laboring groups and those of professional, business, and clerical groups. It

¹³ Cf. C. C. Spiker, "An Empirical Study of Factors Associated with Certain Indices of Speech Sounds of Young Children." Doctor's Dissertation, State University of Iowa, 1951.

¹⁴ Irwin, *op. cit.*

is also interesting, but not surprising, to observe that sex differences in the production of speech sounds, in favor of girls, are observable by the twentieth month.¹⁵ The superiority of girls in language usage in later years will be noted also in Chapter XI.

A word of caution seems to be in order. It appears to be true that ample vocal stimulation and opportunities for vocal play, such as are provided by parents in a normal home, are highly favorable to the development of speech sounds; and that a dearth of stimulation, such as that among orphanage and deaf-born children, seems to result in vocal retardation. In the face of this kind of evidence one is tempted to conclude that early precocity in speech-sound development can be produced by early, systematic, and vigorous efforts to provide stimulation. While the evidence at this point is meager, such as we have, both direct and indirect, suggests that a point of diminishing returns is soon reached. Such intensive training is not at all necessary, and probably does little good.

The following is a running account of the approximate age of onset of certain selected speech-sound activities: vocal play, 4-6 months; imitation of sounds, 6-10 months; first word, 8-13 months; expressive sounds and conversational jargon, 8-18 months; following simple commands, 10-14 months; second word 12-14 months; responding to "no" and "don't," 12-18 months; naming objects or pictures, 17-22 months; combining words into speech, 18-24 months; first use of pronouns, 23-25 months; first phrases and sentences, 23-25 months; understanding prepositions, 25-26 months.¹⁶

Vocabulary. It is quite difficult to secure accurate measures of general vocabulary at any age. It is somewhat easier to determine relative growth in vocabulary as found by a given method. For example, vocabulary tests are used widely in intelligence-test batteries. Graded vocabulary tests of 50 to 100 words are quite reliable and serve very well to rank children or adults in terms of

¹⁵ Spiker, *op. cit.*

¹⁶ D. McCarthy, "Language Development in Children," in L. Carmichael, ed., *Manual of Child Psychology* (New York: John Wiley and Sons, 1946).

relative size of vocabulary, but they do not at any age tell us the size of total vocabulary corresponding to the various test scores. When our interest is not in assessing intelligence but in determining total vocabulary, as it is at present, we should bear in mind that we cannot make a general statement about the vocabulary of a child or a group. We can only say that by a given method of determination the child, or group, was *found* to have a vocabulary of a certain size. Actually, "vocabulary" is an equivocal term. If we say a six-year-old child has a vocabulary of 5000 words, do we mean he uses this number of words, that he can recognize them in listening, or that he can define them? With young children we cannot use paper-and-pencil tests. We have to depend upon our ears. We must expect large errors, especially at ages one, two, and three, because of our inability to understand some of the things a child says. Then there is the problem of our ability to create the right situation for calling out a word even if the child knows it.

Smith selected a sample of 203 words from the Thorndike list of 10,000 most frequently used words. She then used picture situations for the purpose of eliciting the words. By multiplying the obtained scores by an appropriate factor she was able to approximate total vocabularies. Her averages for certain age levels are as follows: 1-year level, 3 words; 2-year level, 272 words; 4-year level, 1540; 6-year level, 2562.¹⁷

Subsequently Seashore and Eckerson produced results that were rather startling in the light of the then prevailing notions on the size of adult vocabularies.¹⁸ It is true that in their grand totals they include both base words or lexical units and derivatives. The latter may be somewhat questionable, since derivatives are more or less standardized. It is a question as to whether they should be counted as separate words. You do not know what *potopoum* is; but if you did, you would also know potopouming,

¹⁷ M. E. Smith, "An Investigation of the Development of the Sentence and the Extent of Vocabulary in Young Children," *University of Iowa Studies in Child Welfare*, 3 (1926), No. 5.

¹⁸ R. H. Seashore and L. D. Eckerson, "The Measurement of Individual Differences in General English Vocabularies," *Journal of Educational Psychology*, 31 (1940), 14-38.

potopoured, potopourable, and so on. Even so, the Seashore-Eckerson results are still startling when base words alone are considered. They drew a sample of 330 base words from a total of 166,000 found in the Funk and Wagnall unabridged dictionary, or one out of every 505 words. The student's score obtained on this test is multiplied by 505 to yield an estimate of the total base-word vocabulary. The test of derivatives was similarly treated. This is a multiple-choice test. It is scored by a "correction-for-guessing" formula. By their test it was found that the average college student has a vocabulary of about 60,000 base words, or about 156,000 words counting derivatives. This is more than three times as great as most of our former estimates, even considering base words alone. In their sample of college students the 10th percentile total score was 112,000 words, and the 90th percentile score, 193,000 words counting derivatives.

The Seashore-Eckerson test is adapted for use at high-school and elementary-school levels. Smith conducted an investigation designed to determine the total vocabulary of pupils for grades 1 to 12.¹⁹ Her results, averages for even-numbered grades, are approximately as follows:

School Grade	2	4	6	8	10	12
Vocabulary in Thousands (base words)	22	28	32	37	42	47
Vocabulary in Thousands (Total)	33	46	52	59	68	75

Language and Thought

Thinking is the act of using symbols. In sensing and perceiving we apprehend, contemplate, or otherwise react to objects or their attributes as presented to our senses. In thought we utilize symbols of these objects and their attributes. Things that are not present here and now—Julius Caesar, the Eiffel Tower, the Easter

¹⁹ M. K. Smith, "Measurement of the Size of General English Vocabulary through the Elementary Grades and High School," *Genetic Psychology Monographs*, 24 (1941), 311-45.

Islands—are represented by symbols. This ability enables us to deal mentally with things of the past, with imaginary things, or with things we have never experienced directly through our senses—things we have heard about, read about, and so on. Moreover, we can sense and perceive at any time or place only those physical things and events outside or inside our bodies which are capable of affecting our sense organs. Abstract things, conceptual things, things that exist only in the mind of man, can never be sensed or perceived; we can sense and perceive only their symbols. Another term for symbolical representation is *ideas*. We sometimes say that there are three kinds of conscious mental data, sensation, perception, and thought. Some writers have included a fourth, feeling.

There are two main kinds of ideas or symbols: language symbols and mental images. In the early history of psychology, when introspectively observed data played a more important role than at present, the subject of imagery received a great deal more attention than it does now. We have never had any dependable objective tests or measures of imagery. No school of psychological thought, not even the functionalist, has been able to make much use of this interesting psychological phenomenon. Here we shall try only to give a brief descriptive account of the subject.

In exposition, images are usually compared with sensations. Theoretically, there are as many kinds of images as there are kinds of sensation; that is to say, the number of image modalities corresponds^a to the number of sense modalities. Images are like sensations in kind or quality. Whatever the quality of the sensation experienced—red or green, triangular or elliptical, euphonious or cacophonous—the subsequently induced image of it is the same in quality. In contrast with sensations, images, in the words of Titchener, are relatively pale, faded, washed-out, misty; they are weaker in intensity, shorter in duration, and are less stable and more fleeting. They are less sharply localized than sensations; they change more rapidly and in meaningless ways.²⁰ The mode of

²⁰ E. B. Titchener, *A Textbook of Psychology* (New York: The Macmillan Company, 1910), pp. 198-99.

arousal of images differs putatively from that of sensations. The latter are aroused by appropriate stimulation applied to a sense organ; images are aroused associatively, or as is sometimes said, centrally. In the opinion of most observers visual and auditory images predominate. This may come about from the fact that visual and auditory sensations play a larger role in our daily lives than do others.

Ostensibly there are vast individual differences in imagery. But since we have no good tests of imagery and no reliable means of investigating it, especially so with children, we know relatively little about the factors with which these differences may be associated. Conceivably these differences might be educationally significant, especially in such subjects as spelling, music, art, geometry.

Imagery is a vehicle of thought inasmuch as it is a means of representing things not at the moment present to the senses. That is to say, without the help of language, images by themselves may serve this function. This is imagery of *things* themselves, not images of language symbols. Without the aid of language, imagery alone would be a very imperfect mode of thought. In conceptual thinking, in the field of general knowledge, in all aspects of relational thinking, in connected thinking, we require language. Our syntax and logic are syntax and logic of words; our grammar is the grammar of words. How without language could we think the subjunctive mood, the future tense, or the third person singular pronoun, neuter gender? How without language could we think *if, as, therefore, because,* or any other important signifying relationships, to say nothing of abstractions? We may not have to say these words; conceivably we may use images of words, but this is language none the less. Even when thought is mediated by subvocal speech, imagery may be present and serve an ancillary function by way of adding color or vividness to the thought process. Moreover, in constructive imagination and especially in artistic and mechanical design, or in the composition of music, imagery may be of the greatest value.

When we come to the intellectual pursuits of man considered

broadly, we must conclude that imagery is at best only an aid to thought. The base of thought is language—including, of course, mathematical symbols, musical notation, monetary tokens, and gesture, as well as the spoken and printed word. As Hobbes says, "... it is evident that truth and falsity have no place but amongst such living creatures as use speech."

For centuries scholars have recognized the inseparability of language and thought. In 1887 Mueller wrote: "Our divine reason is really no more than human language. . . . We do not begin with thinking or ideation and then proceed to speaking, but we begin with naming. . . . Reasoning without words is no more than reasoning without pronouncing words."²¹ "To think is to speak with oneself."—Kant

One of the most comprehensive statements to be found on this subject is one by Mansel (1850), quoted by Mueller as follows:

That language (verbal or other) is inseparable from thought is rendered morally certain by the impossibility under which we labor of forming universal notions without the aid of voluntary symbols. The instant we advance beyond the perception of that which is present now and here, our knowledge can only be representative; as soon as we rise above the individual object, our representative sign must be arbitrary.²²

Similar opinions have been voiced by many of the great thinkers of past generations: Hobbes, Humboldt, Schelling, Hegel, Schopenhauer, and Mill.

Language may be employed in more than one way in thought. Language symbols are equivocal. Take such words as "if," "as," and "because." (Words denoting picturable objects, like "dog," are purposely omitted. In such case one could dispense with language altogether and simply instate a mental image of some animal of that species.) Think of the number of different ways these symbols may be used. "If," "as," and "because," and all other words

²¹ F. M. Mueller, *The Science of Thought* (New York: Charles Scribner's Sons, 1887).

²² *Ibid.*, p. 50.

are auditory words, they are written words, and they are pronounceable words; but they are also symbols. They can, conceivably, be represented by three kinds of imagery: auditory, visual, and kinesthetic. They can also be spoken audibly or inaudibly, or as we usually say, explicitly or implicitly. Since we cannot tell precisely what a person is doing when he is thinking, we do not know the relative frequency with which these various media are used, or how individuals differ in this respect. It is quite conceivable that two or more of these media may be used simultaneously, or that a person may shift from one to the other in an act of thought.

The school of psychological thought known as behaviorism has emphasized subvocal speech as the medium of thought. Thus Watson in 1920 defined thinking as subvocal language, meaning an implicit saying of the constituent words.²³ If I think "if" I must use the word, because there is no "if" but the word. But it seems possible to use the word without speaking it. I may "see" it as a printed word, or "hear" it as a spoken word, or "feel" it as a kinesthetic word—all through the medium of imagery; at least I think I can do so if I try. This is not to deny that subvocal speech is chiefly what thought is. Psychology in America has one way or another become largely behavioristic in character. According to this point of view what we do in mental life is to behave, to respond to stimuli. It is more natural to think of speech, vocal or subvocal, as a response than it is to think of a mental image as a response, at least a muscular response, although there is a rather attractive motor theory of imagery.

At least the idea prevails that thought is behavior, and largely language behavior, and as such can be incorporated into systematic behavior theory. What the theoretical psychologist is interested in, of course, is the development of a naturalistic explanation of mental life—all mental life, higher as well as lower, that of men as well as that of lower animals—in somewhat the same sense that we have naturalistic explanations of the development of

²³ J. B. Watson, "Is Thinking Merely the Action of Language Mechanism?" *British Journal of Psychology*, 11 (1920), 87-104.

living forms. In the biological world the same explanations seem to hold for plants and animals, all living things—big plants and animals or little ones. Explanations become acceptable because they seem plausible, because men accept them, because they fit the known facts, because there are not too many exceptions or too many things the theories do not account for.

Language and thought are learned. Of this there is no doubt. There may conceivably be some doubt as to whether or not thought is behavior, though psychology generally so regards it. Hence psychology regards language and thought as learned behavior. In earlier pages of this chapter and in Chapter II the basic conditions of learning as conceived by S-R learning theory, were given.²⁴ The fact that so much of the psychologist's experimental work has been done with rats, monkeys, and other lower animals, and with so-called lower forms of behavior in man, to a comparative neglect of the higher mental processes should not disturb us, at least at the present stage of development. The question of whether or not laws established for lower forms of mental life are applicable to higher forms, which is natural enough, is not so crucial as the question of whether or not we have the right laws for any form of behavior. It is scarcely conceivable, though for all that, it may be true, that there is one set of laws of behavior for the rat, another for the monkey, and still another for man; or that there is one set for the lower forms of behavior and another for the higher.

In order to extend the essential conditions of learning (cue discrimination, response, motivation, and reinforcement) to the higher mental processes, about the only assumption we have to make is that mental phenomena, all mental phenomena, are behavior phenomena. Much of our thought is self-initiated and self-sustaining, in the sense that it is not initiated, sustained, or

²⁴ Learning theory is discussed more fully in a later chapter. Perhaps it should be noted here that there are thousands of psychologists. All do not conceive learning theory in quite the same way. There are differences of opinion even among those who subscribe to the association tradition. There is also another school of thought, *field psychology*, which scarcely subscribes to associationism at all. (This school is discussed in Chapter X.)

influenced by events occurring in the immediate external environment. The cues or stimuli are self-initiated or, as is commonly said, response-initiated. The response we make to one situation, to one stimulus pattern, becomes a stimulus or cue for the next response, and so on.

We recognize two main classes of stimuli, those which come from without and those which come from within. Some of those which come from within are produced by the behavior of the organism itself; that is an elementary fact of physiology. This implies that there are receptors or sensory mechanisms within the body for receiving these response-produced stimuli; this is also an elementary fact of physiology. "By the aid of such receptor processes the organism becomes relatively independent of its external environment and can regulate its own behavior to an extent impossible in infrahuman animals."²⁵

Thus the condition of self-stimulation, self-control of our thought process, seems to cause us no trouble. As has just been said, the only assumption we have to make in our efforts to bring the higher mental processes within the framework of current S-R behavior theory is that mental phenomena are behavior phenomena—and this is certainly not a radical or an unreasonable assumption. There is, however, one other condition that must be set forth—the condition for drive and reinforcement. We have already seen that the satisfaction of any motivating condition, the realization of a goal, is rewarding. This is what is meant by "reinforcement." It is axiomatic that the satisfaction of motivating conditions is rewarding. To deny this practically amounts to unsaying what has just been said about motivation. This idea was expressed in substance in Ach's first law of feeling, enunciated in 1910: "If realization occurs in accordance with the determination, there results as a rule a pleasant feeling."

What we must do here is account for self-reward. Much of our thinking is a private matter; there is no one present to approve or disapprove. Much of it does not even eventuate in immediate

²⁵ W. S. Hunter and C. V. Hudgins, "Voluntary Activity from the Standpoint of Behaviorism," *Journal of General Psychology*, 10 (1934), 198-204.

overt action that might bring rewarding results. But reward has no meaning apart from drive; nothing can be rewarding aside from some motivating condition that is satisfied. In Chapter II attention was called to the mechanism of self-control in character development, the mechanism of internal drive and self-reward. Here let us note some of the possibilities for internal drive and self-reward in thought.

First, we have the phenomenon of ego, a phenomenon that is probably a universal characteristic of mankind, except for infants and idiots. Right thinking, clear thinking, is more satisfying than wrong or fuzzy thinking. Others have rewarded us for clear thinking and have ridiculed us for illogical and wrong thinking. From early childhood, speech that states a fact correctly (that is, according to convention), grammatically correct speech, logical and forceful speech, have been rewarded by social approval. By such means we have enhanced our prestige and our own self-evaluation. When we say things poorly, or say things that are untrue, we lose in prestige and self-approval. In all our experiences in life we have found that it is rewarding to be right, to sense, perceive, judge, understand, infer, and conclude rightly. And when we talk to ourselves, we like to be right, cogent, and forceful, because we have internalized this external reward and punishment.

One would be naïve indeed to suppose that all thinking and talking is like this. Different intellectual circles make different demands, approve of different things, reward different kinds of speech and thought. There is loud talk, bold talk, senseless talk, funny talk, witty talk, prejudiced talk. These same adjectives may be used to characterize the talking we do to ourselves. This kind of talking and thinking is just as real, just as characteristic of man, as the cogent, logical speech spoken of in the last paragraph. It requires explanation also, and is explainable by the same set of operations. The nature of the drive and the consequent satisfaction may be somewhat different. It may be just as rewarding, or even more so. The drive may be to attract attention by loud, bold, rash, or senseless talk; to make one's presence felt; to win favor-

able reaction from others by funny or witty talk; to express aggression and hostility; to justify one's loyalties in politics, sports, race, religion, and so on by prejudiced talk and thought. The aim of this kind of talking and thinking is not to get at the truth, to be right or logical. Also, one may take certain liberties with the truth for the sake of aesthetic expression. These things are all motivated behavior; they are all rewarding.

In academic training, and especially in scientific training, we always strive to arrange conditions in favor of straight thinking. This we try to do by creating an atmosphere in which only correct, logical, sensible thought is rewarding—an atmosphere in which incorrect, illogical, prejudiced expressions are either extinguished by nonreward or are actually punished, so that avoidance of anticipated punishment becomes rewarding.

In thinking and talking it makes a great deal of difference whether our aim is to reach the truth or to convince others or ourselves of the truthfulness of something we already believe, or wish to believe, or wish were true. This may be deceptive because the goals may look the same. The drives are different and the rewards are different. One type of behavior, one set of attitudes, and one set of drives, is just as learnable as the other. Moreover, the achievement of the goal *may be*, under certain conditions, just as rewarding under one motivation as under the other.

As in character formation, the controls—the rewards and punishments associated with speech—come originally from the outside; they are applied by others. As we become positively identified with the people who apply the controls, with their aims and purposes, we internalize these controls, or generalize them, to the extent that these aims and purposes become our own. Then the conditions for drive and self-reward have become a reality.

In this section, on the assumption that mental phenomena are behavior phenomena, the aim has been to show that the higher mental phenomena are as amenable to S-R conceptualization as are the lower mental phenomena, and are explainable by the same set of operations.

The power of speech. "The language of a people is its mind and mind is its language."—Humboldt. To a child of two, a tree is a tree and a flower is a flower. Even this simple distinction is made because society before him has made the distinction and has given each objective a name. We can never overemphasize the fact of the social origin not only of our thought but also of our everyday *perceptions*. The fact that society has given names to hundreds of different trees, flowers, and plants leads us to discriminate among them and perceive their differences. First, we would not and could not in any very useful way make these discriminations unless each was clearly designated by a name. Second, society has not only marked with a name every known thing that is of any use or that has excited curiosity, but demands through social pressures that the individual make these distinctions, depending upon the level of his culture.

At the common-man level it is usually sufficient to recognize and be able to name the species of trees and plants, or the more common ones. The student of botany must soon begin to classify, and according to heads that have well-marked names. He also learns the characteristics of the plants because these characteristics have names. Let us edge into this problem a little further with respect to a single division of plant life, the fungi. To begin with, we find that these are dependent plants. How could anyone observe that fact, or think that fact, except as this characteristic of plants has a name, unless marked by an arbitrary symbol? This again tells us that thought, and to a large extent perception, have a social genesis. When a plant is designated as dependent and we understand what that is, the next question that comes to mind is, Why must it be so? We cannot frame this question except through the use of speech. Moreover, how can we understand or think the answer, "absence of chlorophyll," without the words "absence of" and "chlorophyll"? Of course, any other words conventionally employed for the same purpose would do just as well. Then we learn that there are saprophytic (feeding on organic matter) and parasitic (feeding on living matter) fungi, and that there are three great subdivisions of fungi, Phycomycetes, Asco-

mycetes, and Basidiomycetes. To be sure, the great Cato of ancient Rome, who grafted, pruned, and hoed his grapes with the expectation of an ultimate yield of sound wine, got along pretty well without this knowledge; so did growers of mushrooms, diggers of truffles, and the Roquefort-cheese makers. But not so the makers of penicillin. Phycomycetes and the rest are not just big words for the student to learn. These names when learned influence his thinking about fungi, and his observations of them. Moreover, when we name a group of plants *fungi* and learn some of the characteristics of this group, we are induced to ask about other groups and to inquire into their peculiar characteristics. Such differentiation is one of the consequences of our having names for things.

The reader has probably already concluded that someone observed, differentiated, and understood before names were applied, else how do we account for the names? That is true. Someone did, some careful student of the phenomenon, some great genius. The famed Linnaeus caught the differentiating and unifying principle of *species*, and so labeled it. This was a tremendous intellectual achievement. Now a school child can make this observation or think this fact.

Basic English. A rich vocabulary sharpens our thinking. We should not be deceived about the purpose of Basic English. The proposal to provide a kind of international language consisting of 850 words, a kind of common coding system to which the 2500 languages and dialects of the world could be reduced, is a wonderful idea. Such an international system of communication could be rather easily learned and would enable people all over the world to communicate, at least at a practical level, fairly well. But it should be understood that Basic English is strictly a language for communication. It is not a language for thought. It presupposes another language consisting of tens of thousands of words in which thinking will be done. This is not to argue that there may not be superfluous words in any highly developed language. But we should appreciate the fact that were the language of a people limited to 850 words, all others being

abandoned—if this represented the largest number of words ever known to the people and to their ancestors who wrote the “poetry,” the “novels,” the “history,” and prepared the “treatises” on science and philosophy—we should have to suppose the intellectual development of such people to be on the order of that of a small child. The language of a people is its mind, and mind is its language!

Let us take as an example the word “bad.” That is a pretty good word in child language, and very useful. In adult life it is largely restricted to “the opposite of good,” and to designating one of the ways we feel. We can say the man is bad, but generally we like to be more discriminating in our speaking and thinking—that he is wicked, malicious, dishonest, untruthful, fraudulent, deceitful, lazy, unreliable, infirm or ill, or ugly. We have used up quite a few of our 850 words without getting a good start on the single word “bad.” Then there are different words for each one of those just used. Take “untruthful”; we might have said the man is a liar, that he fibs, prevaricates, and so on. There is also a wide assortment of adjectives that reinforce and qualify. This variety of words helps us *to say what we mean. It helps equally to mean what we mean*; helps us to think discriminatingly as well as express ourselves discriminatingly.

We may assume that words came into existence because they were needed in thinking and communication. Of the 600,000 words in the English language there probably are many which serve no more important purpose than gratifying the egos of those scholarly folk who use them. This does the rest of us no harm—“What we don’t know doesn’t hurt us.” Even this degree of usefulness compares favorably with that of our neckties, which must run annually into a business of many millions of dollars.

What we communicate. The basis of communication is the symbol’s awakening the same response in the listener and the speaker. Communication is limited only by the limits of the human mind. There are many legitimate functions of communication, but it is usually well to keep these functions straight. What are the things a person says when he speaks or writes? He may

communicate a fact, or what he believes to be a fact, or what is commonly regarded as a fact. He may communicate a feeling. This too may be a fact in the sense that he feels the way he says he does, but we need not concern ourselves with whether that about which he feels is factually true or not. Beautiful poetry and music have been written and beautiful pictures have been painted about things of very questionable factual existence. Also, when a person talks or writes he may say a great deal he did not intend. He may be saying, inadvertently, "I am prejudiced," or "I do not know what I am talking about." Though a speaker may sometimes preface a remark with a statement to some such effect, it is not at all necessary; it almost amounts to a redundancy. Not knowing what one is talking about is one of the most readily communicated things in the world.

In many respects the world of science and scholarship differs from the world of ordinary affairs. The best answer in science and scholarship is the correct one. The statements that are most rewarding are those which are nearest the truth. Truth and reward are the same. If I am in the advertising business, my reward comes from the sale of products. Being strictly correct and being successful may not always amount to quite the same thing. If I am a politician or a reformer, my criterion of success, and my reward, is a function of the number of people I can persuade to agree with me. If this deviates much or little from the best estimates of the truth, if I have won a sufficient number of followers I am not repudiated.

To be sure, we need both sorts of people. To a scientist or to anyone else, the way to make an atomic bomb is the way to make one. Only a spy would gain anything by proposing a wrong way. Here we are dealing with the world of reality. But there is also the nonscientific world of value. While we like to think that value is related to rightness and wrongness, it is not dependent upon them. When a person expresses a belief or an opinion, he is, or may be, stating a fact; but the truth of what he has stated does not rest upon objective reality. It may not even express social wisdom. What we should do with the atom bomb, whether or not

we should have done with it what we have already done, is a question of value.

In addition to facts and value judgments there are also inferences, meanings, and judgments, hypotheses, and assumptions. All of this is, of course, quite elementary, but none the less important. Has the speaker stated a fact, a testable, observable fact? Has he expressed a value judgment, an inference, a meaning, a judgment, an assumption? Also, since each is a legitimate end of discourse, has he indicated directly or indirectly precisely his intention?

In the normal course of events we learn an amazing amount about this sort of thing. A rank outsider might predict that the individual would be helpless in the face of mass media communication. We have long since come to accept overstatement, extravagant statement, and statements not susceptible of proof, as a part of our national life. We read the statement "This group of masterworks records should be in every home" without offense, knowing full well that it could be argued successfully that it has no place at all in millions of homes.

Teaching and Learning

The history of the schoolmaster is a history of his troubles. We read about the evil days of the past in which school children were put to learning isolated facts, and rules, and committing to memory passages that had little meaning to them. Getting rid of this "ugly" kind of learning, as Wertheimer called it, has certainly been one of our most troublesome problems. As if in exasperation, some have said we of the schools should not teach facts, but should teach our pupils to think. But how are they to come by all the hard facts they need for thinking and understanding? Obviously, the safer course lies somewhere between the two methods. Perhaps a pupil can learn facts without learning to think; that is, he can learn in this ugly way without learning either to think or to understand very much. But the reverse is not

true. He cannot learn to understand and to think without learning facts.

We should teach facts and thinking at the same time. This should be our guide as to what facts to teach. We should teach, or better, provide the opportunity for the pupil to learn, such facts as he needs for thinking, for understanding, and do so as he needs them. When the pupil has asked all the questions he needs to ask and has learned or recalled all the facts he needs in order to answer the questions, we may be pretty sure he has exercised most of the processes of thinking.

Thus our task is to encourage pupils to learn facts and to acquire a wholesome respect for factual information. To encourage students to talk and argue without recourse to readily attainable facts is to encourage the cultivation of bad habits. It is the attempt to learn *mere* facts, facts as isolated phenomena, that is to be decried. Factual information should be taught or learned only when it contributes to the understanding of something. When the acquisition of specific items of information is thus made subordinate, there can be no question of learning useless information, or of learning too much factual information or information that cannot be applied. Rather the problem would always be to acquire enough information to make an intelligent attack upon a problem. If teacher and pupil start with a problem—a problem that is meaningful to the pupil, one that, in the light of his development, he is ready to consider—and proceed to search for and examine the facts relative to the problem, one of the prime conditions of the development of critical thinking has been met.

Let us take an example from elementary geography. We learn that the western coast of British Columbia, Washington, and Oregon comprises a dense rain forest, whereas much of the central and eastern portions of these regions are arid. Knowing these facts, the pupil is ready to ask why. He learns that for thousands of miles westerly winds have been blowing off the warm Pacific. The air is warm and moist when it reaches the coastal region. But what causes so much rain? This warm, moist air in its eastward course must pass up and over cooler areas of the

coastal ranges. In cooling, the air condenses and gives up some of its moisture in the form of rain.

Would we expect to find something of the same thing in other regions where similar conditions exist? Let us look at the western coast of central Mexico. It is dry there. There are mountains near the ocean, but the prevailing winds in that latitude blow from the land out to sea. What about the coasts of Chile and Peru? They have westerly winds from across the Pacific. This coast line has high mountain ranges inland and narrow coastal plains to the leeward. Do we have rain forests here? No. Generally the annual rainfall is less than an inch. Once in a long while the region is visited by great floods, but in normal years the Humboldt Current, a cold current running northward and fed by upswelling from the cold deep, serves to chill the air before it reaches the mainland. But why do rains sometimes come with destructive force? Does the Humboldt Current ever turn out to sea at a point farther south, so that the warm equatorial waters could flow down along the coast? Is it a fact that this happens? Does the time at which this occurs coincide with periods of torrential rains?

This example is not in any wise intended as a model lesson plan. It is not even suggested that this is the right way to begin and end the discussion, or the right order in which to develop it. It is put forth merely to illustrate that the kind of questions we ask depends upon the kind of facts we have at our command—to illustrate the inseparability of thinking and facts.

Any sensible question grows out of some kind of knowledge. A pupil who does not know that the prevailing winds in our latitude are westerlies and that those between the 30th parallel north and the 30th parallel south are easterlies, is not likely to look for an explanation of these prevailing wind directions. The same could be said of the tides. Each fact learned tends to pose another question. When the fact that the tide "ebbs and flows twice in twenty-four hours" really makes an impression upon the pupil's mind, he discovers that before this he had only part of the explanation. Then there is the fact that along some coast lines tides are relatively inconsequential, say at Jacksonville, Florida. In some

places one scarcely needs do more than roll up his pants. At other places the tide is a tremendous event, running to a difference of 40 to 50 feet between the high and the low, as in the Bay of Fundy. The student thus learns that the direct pull of the moon and the sun is not sufficient to account for all the facts of tides. Then there are "spring tides" and "neaps." What are they, and what is their explanation? Without some knowledge of facts there is really nothing to think about or explain. Yet it is just as true that facts supply our explanations. This is the way a pupil learns to think, especially with the proviso that he learn the facts as he needs them. We should never allow the objectives of learning facts and learning to think to become separated. The two belong together. It is by developing the two together, making each serve the other, that we have our best hope of developing educated minds.

Meaningfulness in instruction. Perhaps if there is any proposition which would receive fuller endorsement than any other in education and psychology it is that instruction should be meaningful. The only problem is one of procedure. There are thousands of psychologists and educational theorists. One might suspect that somewhere at some period in history someone must have maintained that meaningless, rote learning is more efficient, more enduring, or more functional than meaningful learning. If there has ever been such a person, he was surely never taken seriously. Now it is true that some of us have accused others of believing in meaningless instruction, or of holding theoretical views that logically lead to such a position. Much of this will be found in educational literature. It is also true that there has been a great deal of meaningless instruction, and there still is; but this, like sin, may be attributed to weakness of the flesh. No one advocates it.

The word "meaning," when applied to instruction, has more than a single meaning. Let us concern ourselves here with two of the usages. One of the things we have in mind when we speak of meaningful instruction is *understanding*, as opposed to rote learning. A pupil could learn by rote to say the words "It was

feared the Confederates would gain command of the heights overlooking Washington," and do so without knowing much of anything about what the words really said—without knowing who the Confederates were, or what was meant by "gain command," "heights," "overlooking," or even "Washington." On the other hand, he could understand the sentence; that is, he could learn what the words said, not just the words. Another thing we may have in mind when we use the term "meaningful instruction" is worth-while, vital, or interesting instruction that furthers the pupil's needs and purposes. The term will be used here in both of these senses.

In the last decade or so we have witnessed some interesting developments in the teaching of meaningfulness in arithmetic.²⁶ One approach in the early stages of teaching numbers is the meaning of counting. Young children are employed in many kinds of social activity in which counting is used to tell how many (cardinal counting), or to tell position or arrange objects in ordinal position by counting (ordinal counting). They are led to see that the last number named tells how many. In the beginning children are encouraged to use a variety of devices for determining or expressing quantity. They may be told that primitive people often counted by analogy; for example, that an Apache Indian kept track of his ponies by placing a pebble in a little bag for each pony in his possession; that the ancient Egyptian represented quantity by drawing pictures—five pictures of camels to signify five camels or, later, one camel and five marks. Exercises are provided in showing quantity in various ways, as telling *five*, by 11111, 1111 1, 11 111, and so on as well as by a number name. A little later children are encouraged to use the conventional and most convenient way of determining or expressing quantity.

The young learners (for example, in early lessons in the second grade) may be given instruction in the meaning of position. Attention is called to the difference between the 1 in 10 and the 1 in 1, or in 21; the 2 in 20 and the 2 in 2; and so on. The

²⁶ See H. F. Spitzer, *The Teaching of Arithmetic* (Boston: Houghton Mifflin Co., 1954).

abacus has proved useful for this purpose. The function of zero as a place holder may be made the object of instruction, as well as the Hindu-Arabic number system generally. The quantities 20 and 2, for example, are presented and the pupils are invited to tell the difference in the two 2s, and the function of the zero; or 222, in which they are asked to tell what the first 2 says, what the second, and what the third, or the significance of 0 in 202—from this the concept of zero as a place holder is developed. In such ways pupils are led to see that in our number system a digit may represent two quantities, one by its name and another by its position. They are also led to see that twenty, thirty, forty, and fifty are but other names for two tens, three tens, and so on. Thus learning to count may and should involve a great deal beside the arbitrary sequential learning of the number names by rote. The reader who is interested in knowing how these teaching procedures are really carried out in the classroom should consult some of the recent professional books on the teaching of arithmetic.

There are 81 basic addition and 81 basic subtraction facts to be learned, exclusive of zero facts. The teacher can wait until the proper time, at least the conventional time, and enlist the energies of the pupils in learning these by rote. This “ugly” way is not much fun, except to a few who can derive ego satisfaction from learning them more quickly than most others; it is not a very vital or meaningful activity, except as the children perceive this knowledge as a means of growing up, becoming like older children and adults, and escaping from the narrow confines of childhood. It is better to make some preparation, do some readiness work—some “building of number concepts”—so that the pupils will better understand what they are doing and will better appreciate the need or the social usefulness of what they are asked to do.

Spitzer lists four number concepts which he considers prerequisite to addition and subtraction and suggests instructional procedures for the building of these concepts—enough procedures in sufficient variety to make them functional.²⁷ These are: “(1)

²⁷ *Ibid.*, Chap. III.

the idea of identifying quantities by means of number names; (2) the idea of grouping to facilitate counting; (3) the idea of substituting one quantity for another; and (4) the idea of rearranging two or more quantities into a single group." Emphasis is given to the fact that the basic arithmetic operations, addition, subtraction, multiplication, and division, are convenient and conventional ways of counting. In the expression $7 + 3 + 8$ we have 7 1s, 3 1s, and 8 1s. We have not changed the amount when we write the sum 18, though 18 is a more convenient expression than $7 + 3 + 8$ and sharpens our thinking. There is no doubt that 18 is more than 17, while it might not be immediately apparent that it is more than $5 + 9 + 3$. Similarly, the expression 6×8 says we have 6 8s or 8 6s. This expression says the same thing as 48.

If we say 6 8s equal 48, we have said the same thing as $\frac{48}{8}$. Pupils are led by experience to see that the answers to all such problems can be obtained by counting. In fact, finding by counting that $7 + 3 + 8 = 18$ is to be regarded as an intelligent procedure in the early stages of learning arithmetic; or at any stage if this is the best that can be done. It is after the pupil has had considerable experience with counting in attacking problems such as the foregoing that he is ready to undertake the "mastery" of basic addition, subtraction, multiplication, and division facts.

The use of standard reference points is advocated as a method of teaching young learners to understand number concepts better. The statement that the area of the USSR is 8,819,791 square miles is certainly not very meaningful to the average reader. It is only by comparison that this quantity may be given meaning. An American reader might be interested in comparing this area with that of the United States, or with the continent of North America. The observation that the area of Russia is nearly 800,000 square miles larger than the continent of North America tends to satisfy the reader that he knows how big Russia is.

We can see this tendency in our difficulty in comprehending relatively long distances expressed in feet or yards, for which we do not commonly have standards of reference, as we do in miles.

In the height of mountains we do have standards in terms of feet, as in Pikes Peak or Mount Everest. The reader frequently converts unfamiliar units into familiar ones. The average reader comprehends the longer distances in terms of miles better than in terms of yards for the reason that his standard reference points for such distances are in miles. He has reference points for miles because longer distances have, in his environment, commonly been expressed in miles rather than in yards. Our difficulty in thinking in terms of kilometers does not arise so much from the fact that we do not at once know how much a kilometer is as from the fact that we have no standard references. Thus one aspect of mental development, the ability to understand quantity as expressed in number, is accomplished by the building up of standards of reference. In the interest of hastening the formation of such reference points it is advocated by some authorities that a frank attempt be made to teach them in lessons and exercises planned specifically for the purpose.

We actually build up our concepts of abstract numbers in a manner similar to that in which our standards were developed by our ancestors, one important difference being that we start with standard systems of measurement and work backward, as it were, to reference points such as those on which our forebears were forced to rely in thinking and communication. Spatial data are continuous and are not formed of discrete units. Men of less advanced culture have invented, as Judd points out, wholly artificial units insofar as space itself is concerned. Long distances were described in terms of so many days' journey or the number of moons required to traverse the distance; shorter distances, in terms of an arrow's flight or a stone's throw; still shorter ones, in terms of the length of a human foot or the width of the hand. Likewise, in the field of weights concrete objects served as a means of thinking about the abstract. The *grain* was one such unit for small weights; the *stone*, a unit for larger ones. Thus, while our pupils start with ready-made standards of measurement, the meaning of the quantities designated by such expres-

sions as 10 miles, 10 pounds, 100 yards, 100 acres, and the like comes through experience with the concrete.²⁸

It should also be appreciated that when we teach number concepts and number manipulation we are also teaching quantitative thinking. Definite mathematical concepts and means of expression sharpen our observations, make us more discriminating and precise in our thought and expression. Consider our monetary system as a final example of a medium of quantitative thinking. Perhaps no system of measurement represents so strikingly as does money the relationship between the origin of that system and the development of the conceptual units of it. As Judd suggests, money is the most abstract of all the arbitrary means of measurement. Most of us spend time enough in thinking about money, but it has not been sufficiently appreciated that money (as monetary symbols) is a means of thought. We encounter here in addition to the kind of abstraction already discussed—quantity—a new kind of abstraction—value. Thus we use monetary tokens not only in exchange for articles of commerce but also as tokens of value in all our thinking about commercial articles. We may think dollars' worth of wheat quite as easily as bushels of wheat.

When men first began to engage in commerce, the objects of value themselves—articles of food, clothing, warfare, and hunting—were exchanged. The values were concrete and tangible. These concrete objects did not at first lend themselves readily to abstract thinking. Later on, certain *standard* media of exchange came into use, such as tea, tobacco, beads and shells, beaver and buffalo skins. As any such medium became standardized in a group it at once became a means of quantitative thinking. A value could be placed upon any article of commerce in terms of the conventional medium of exchange, as "worth 5, 10, or 50 beaver skins, pounds of tea, hogsheads of tobacco." Here, then, the conditions of abstract units of value are fulfilled. A great advance was made, not alone in commercial transactions but also in exactness of abstract

²⁸ C. H. Judd, *Educational Psychology* (Boston: Houghton Mifflin Co., 1939), Chap. XV.

thinking, when governments undertook to guarantee the purity and the weight of the metals used in coins. A good example, on the negative side, of the abstractness of monetary tokens is the expression "not worth a continental"—a piece of continental currency issued in the Revolutionary period.

Children of all advanced cultures today find a complex system of coinage already in existence. Their task is to learn the meaning of coins as media both of commercial exchange and of quantitative thinking, thinking that involves value so that they may avoid dupery, and thinking that involves quantity in a numerical sense so that, for one thing, they can get back the right change. A child comes to understand 1 dollar, 10 or 100 dollars, in terms of exchange value, and of course to some extent in terms of the number of units each contains. There are various ways of knowing the meaning of money, just as there are of knowing the meaning of any other system of measurement. For example, one way to know a rod is to be able to mark off approximately a distance of that length; another is to know the number of other units—feet, inches and so on—contained in a rod, or how many rods are contained in some larger unit.²⁹

The meaningful teaching and learning of arithmetic has been discussed at some length. Some other subject-matter field could have been chosen just as well; for example, the social studies, reading, or science, or for that matter, art.³⁰ The problem of building basic concepts for understanding in the social studies is similar in many ways to that faced in arithmetic, as is seen in Horn's classical work in this field.³¹ We could call a harbor deep that measures 100 feet at low tide. In fact, a harbor could be called deep that could comfortably accommodate at low tide the largest ocean-going vessels. We could not call a sea deep that measured only 100 feet, nor would a height of 100 feet make

²⁹ Cf. C. H. Judd, *Education as Cultivation of the Higher Mental Processes* (New York: The Macmillan Company, 1936), Chap. IV.

³⁰ See, for example, V. Lowenfeld, *Creative and Mental Growth* (Rev. ed. New York: The Macmillan Company, 1952).

³¹ E. Horn, *Methods of Instruction in the Social Studies* (New York: Charles Scribner's Sons, 1937).

much of a mountain. But 100 feet would make a tall tree. So we see that even here we are faced with problems of reference points in learning some of the concepts we need in the social studies. This is only one of the many things involved in meaningfulness of instruction in those studies. Each such field presents many problems in meaning that are peculiar to itself. The development of techniques of instruction in each field is not a task for psychologists but one for teachers and methods experts.

Psychologists have provided many interesting examples. Wertheimer's parallelogram problem (Figure 4) is one.³² One method of determining the area was set forth as follows: Subtract c from a , add c and a , multiply the sum and difference, take the square root of the product, and multiply the root by b . This is

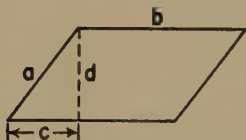


Fig. 4. Wertheimer's parallelogram problem

one way of solving the problem. Students could be taught to solve it in this way. They could learn the steps and carry them out. Perhaps it is admirable for someone to be able to solve the problem in this way. It would make more sense to try to induce the student to see that the problem of determining the area can be resolved into a familiar one, that of determining the area of a rectangle, by taking off a little on one side and adding it to the other. This would enable him to use $b \times d$. The purpose of such instruction is not so much to teach the student to solve this particular problem at this particular time, but to enable him to determine the area of any parallelogram at any time in the future when such a problem arises. What we are really interested in is generalization and retention. It scarcely need be said that the

³² From Miller, *op. cit.*, p. 232.

second procedure is far more likely to ensure the realization of these ends.

Meaning, insight, understanding, should always be our paramount consideration in instruction. As was said earlier, this is not a debatable issue. No systematic position in psychology or education is at variance with this statement. However, certain theorists in both psychology and education maintain that this position is logically incompatible with S-R learning theory. They maintain that S-R theorists cannot explain the relative efficiency and permanence, and the greater functional value of insightful, meaningful learning, as opposed to rote learning. This issue will be discussed in a later chapter. Suffice it to say for the present that these theorists who oppose S-R theory do not have any theoretical explanation of the superiority of this kind of learning. As a matter of fact, S-R theory does have some explanations, although they are not as definitive as one would wish. This issue will be considered again in Chapter X.

Social Development of the Mind

Even a superficial acquaintance with history impresses upon us the overwhelming fact that thought is controlled and limited by fact, by language, and prevailing preconceptions. Without knowledge and without the realism dictated by scientific method, mankind everywhere exhibits an amazing amount of credulity. Two hundred years ago we were trying and condemning witches in courts of law. It is difficult to realize that four hundred years ago, men from the capitals of culture and learning were searching for fountains of youth, fabled cities of gold, and one-breasted Amazons. These were not small-scale enterprises. Coronado, upon the information of one man, marched out of New Mexico with 1500 men, 1000 horses, 500 cattle, 5000 sheep, in quest of a city of gold in Quivira (Kansas).

It is an amazing fact that a hundred and fifty years ago no one but a few Indians knew that the Rocky Mountains existed. We could scarcely find better examples of the errors of men's

thoughts as they tried for three hundred years to resolve the facts of the geography of the North American continent—without facts, with limited ability to communicate with the Indians, and with all kinds of misconceptions to start with. In 1603 Champlain thought the Pacific Ocean was 900 miles west of Montreal. Some of his men had heard from the Indians about a distant sea that smelled bad and on whose shores lived a strange people. When his envoys reached its waters they found not the Pacific, but Lake Michigan; and not the Chinese, but the fish-eating Winnebagos. Perhaps no myth died a harder death or dominated thought and action longer than that of the Northwest Passage. Even Jefferson in his instructions to Lewis and Clark supposed that there might be a portage of 20 miles over some high ground between the headwaters of the Missouri and Columbia rivers, although men had already crossed the continent both to the Arctic and to the Pacific.³³

Think what the mind of the villager in medieval England must have been like. Coulton estimates that his average vocabulary was not more than a few hundred words. Perhaps all except the priests were illiterate. The villages were separated by vast forests, sources of both fear and danger. Few roads connected village with village; many persons never traveled beyond their own in their whole lives. They knew but few people. Their words were few and their ideas were few. A peddler, a wandering friar, or a mason if a church needed repair, brought in such news of the outside world as the villager received. The mental horizons of the people must have been limited to an appalling degree.³⁴

ADDITIONAL REFERENCES

- Brownell, W. A., "Arithmetical Readiness as a Practical Classroom Concept," *Elementary School Journal*, 52 (1951), 15-22
Bryan, F. E., "How Large Are Children's Vocabularies?" *Elementary School Journal*, 54 (1953), 210-16

³³ B. DeVoto, *The Course of Empire* (Boston: Houghton Mifflin Co., 1952).

³⁴ G. G. Coulton, *Medieval Panorama* (Cambridge: University Press, 1938).

- Burnett, R. W., *Teaching Science in the Elementary School*. (New York: Rinehart and Co., 1953)
- Chase, S. and M. T., *Power of Words*. (New York: Harcourt, Brace and Co., 1954)
- Freeman, K., *Helping Children Understand Science*. (Philadelphia: John C. Winston Co., 1954)
- Hughes, V. H., "A Study of the Relationships among Selected Language Abilities," *Journal of Educational Research*, 47 (1953), 97-106
- McQuown, N. A., "Language-Learning from an Anthropological Point of View," *Elementary School Journal*, 54 (1954), 402-08
- Minteer, C., *Words and What They Do to You*. (Evanston, Ill.: Row, Peterson and Co., 1953)
- Russell, D. H., *The Dimensions of Children's Meaning Vocabularies in Grades Four through Twelve*, University of California, Publications in Education, 11 (1954), No. 5
- Serra, M. C., "The Concept Burden of Instructional Materials," *Elementary School Journal*, 53 (1953), 508-12
- UNESCO, *The Teaching of the Social Studies in the U. S.* (Paris: Education Clearing House, 1954)
- U. S. Office of Education, *How Children Can Be Creative*, *Bulletin* (1954), No. 12

THE NATURE AND MEASUREMENT OF INTELLIGENCE

INTELLIGENCE IS SOMETIMES DEFINED operationally as that which intelligence tests measure. This has some small merit in that it enables us to speak of a person's intelligence rather than his intelligence score. But in a sense this definition is a form of "passing the buck." We still want to know what it is that intelligence tests measure, so in effect we are back where we were to start with. Moreover, this operational definition does not help us much when we make an intelligence test. Here we must face the problem of what it is we want the test to measure. The operations we go through when we build a test of course define our own conception of intelligence.

Intelligence tests were originally developed for use in school situations, and although their use has expanded tremendously—in the armed forces, in clinics, in industry, and in government, particularly in their application to selection, placement, and training—they still find their greatest employment in schools. Intelligence tests are used in determining whether or not children are educable; in selecting pupils for special education classes, especially those for the mentally retarded and the gifted; in vocational counseling; and in clinical and remedial programs of various kinds. One way or another we expect intelligence tests to rank students or other examinees in terms of ability to learn, to make a good response, to think abstractly, to remember, to per-

ceive relationships, and to display insight and good judgment in situations requiring thought.

These and similar abilities make up what we call general intelligence. This is what Binet, whose tests have been our best models, attempted to measure about a half century ago. It is true that Binet expressed himself more guardedly, in that he sought to obtain a "general average" of intelligence.

To a very large extent experience since the pioneering work of Binet has confirmed the "general average"—converted into some derived score such as MA, IQ or standard score—as a means of expressing performance on intelligence tests. To put it the other way round, relatively little profit has been demonstrated in analyzing scores into their parts—so far as normal school procedure is concerned. For example, we could so design a test that Subtest 1 deals with vocabulary; Subtest 2, with general information; Subtest 3, with memory; Subtest 4, with reasoning; Subtest 5, with quantitative thinking, and so on, and in the end we could plot profiles for each pupil showing his standing on each subtest. In fact, this sort of thing has been done. Two excellent examples are the tests of Primary Mental Abilities and the Wechsler tests. Both of these test batteries yield a total score as well as part scores. Both are excellent batteries.

The Wechsler tests were designed primarily for clinical purposes, where the diagnostic features provided by the profiles have proved to be highly serviceable. But again, in the normal course of school use the total score, the MA or IQ, seems to tell the story so far as a child's capabilities are concerned. The Wechsler test really provides two such scores, the verbal and the nonverbal or performance. Ordinarily the verbal IQ is a little more closely associated with scholastic achievement than is the nonverbal. There are, of course, special cases in which the nonverbal score would be more indicative than the verbal—as in the case of children having special language defects, because of a foreign-language background, or being born hard of hearing, and so on. But this does not deny the proposition that what we seem to be

dealing with is general intellectual ability. While information of this kind hardly proves the case for general intelligence, we may have the right to think that were special intellectual abilities quite obvious, they would have become more firmly established as facts of psychology, in view of all the work that has been done on the measurement of intelligence.

To return to Binet, what we have in an MA score of 10, for example, is a "general average." Is one MA of 10, one general average, any better than another? It is highly questionable whether by inspecting the part scores of which the MA is an average, we can predict that a child is better suited to mathematics, for example, than to science, or literature, or spelling; that he is more fitted for a legal than for a scientific or a literary career. Remember, we are considering intelligence tests. (There may be other kinds of tests, for example, Vocational Aptitude tests, by which this can be done.)

The nature of intelligence poses quite a complicated problem. All that is attempted here is a kind of general interpretation at the practical level. Thurstone analyzed mental abilities, by a method of factor analysis, into a number of primary mental abilities.¹ (The well-known PMA test provides for six.) There are mental abilities that are not closely associated with intelligence and/or scholastic aptitude. It may be quite useful to have separate measures of these various mental abilities, as in vocational selection and guidance. But again, when it comes to predicting scholastic achievement we do about as well as to use the total score. The names of the Thurstone primary mental abilities are as follows: verbal, reasoning, number, word, spatial, and memory. Schools would be about as well off to use V alone, since R, N, W, S and M do not add much to the magnitude of correlation coefficients between academic achievement scores and PMA scores. Shaw obtained the following correlation coefficients (r) and multiple correlation coefficients (R) between

¹ L. L. Thurstone, "Primary Mental Abilities," *Psychometric Monograph No. 1* (Chicago: University of Chicago Press, 1938).

the various tests of the PMA battery and Iowa Tests of Educational Development scores:²

ITED	V	R	N	S	M	W
r	.79	.50	.36	.36	.24	.36
R	.79	.81	.82	.82	.82	.82

What are the factors responsible for—at least associated with—the vast differences in measured intelligence found in any large random sampling drawn from the general population? Let us note some of the major factors here and consider them somewhat more fully in the following chapter. Most psychologists seem to think that genetic factors are the most important of all. We have no way of measuring genetic factors directly. We should never assume that intelligence tests are measures of genetic intelligence. They measure behavior, intelligent behavior, which is almost certainly influenced by genetics, and to an important degree. But a person cannot behave intelligently until he has learned a great deal. How much one can learn and the speed with which he learns are, most psychologists think, determined to a great extent by his genes. They are also determined by the opportunities he has had to learn and the amount of stimulation and pressure to learn he has been subjected to. By opportunity we usually mean the cultural level of his society, of his community, of his family, and so on; but it also means freedom or restriction in the use of his eyes and ears, and even in moving about in his environment. There are also various kinds of brain damage—cerebral palsy, encephalitis, and so on—many of which have little or nothing to do with genetics, but which may limit the ability to learn.

Furthermore, the score a child earns on an intelligence test and the way he behaves in school and life situations may be influenced by what we may call emotional adjustment. We may suppose that a person who is repressed, who feels inferior or insecure, or even one who because of repeated failure has lost

² D. C. Shaw, "A Study of the Relationships between Thurstone Primary Mental Abilities and High School Achievement," *Journal of Educational Psychology*, 40 (1949), 239-49.

self-confidence, will tend to behave at a level somewhat below the level at which he could behave were he free of these "repressing" influences, or were he confident, buoyant, and self-assured.³

It has become a habit to speak of an IQ as if it were something a child *has*, and as if by administering an intelligence test we could find it. An IQ is only a way of scoring the samples of his behavior secured by the test used. Moreover, the IQ obtained represents his score on a particular test, administered at a particular time, under a particular set of circumstances. On another test or on the same test administered at another time we would expect to obtain a somewhat different IQ. Naturally, IQs do not ordinarily fluctuate widely or in meaningless ways, else there would be little point in administering such tests. We never know the "true" IQ, which, after all, is only a concept. What is more important, if we did know a child's "true" IQ, we would not know his true intelligence; we would only know his true score on a particular set of behavior samples.

Historical Sketch

The measurements movement may be said to have been initiated by Francis Galton (1822-1911). The best known of his tests are those of sensory discriminative capacity—lifted weights and the celebrated Galton whistle, and the questionnaire for studying mental imagery. Galton's distinctive contributions to measurement lay, however, in another direction; namely, in statistical method and test theory. On the side of statistics he gave us the methods of standard deviation and correlation, although the latter was a bit crude. On the side of theory, he proposed, as a means of obtaining a general knowledge of the capacities of a man the procedure of "sinking shafts, as it were, at a few critical points," and of ascertaining the best points for the purpose by comparing the measures "with an independent estimate

³ D. Rapaport, *Diagnostic Psychological Testing* (2 vols. Chicago: The Year Book Publishers, Inc., 1945), Vol. I.

of the man's powers." ⁴ Here Galton clearly anticipated Binet's methods of sampling and of determining validity.

Galton's interest in individual differences and the great energy with which he put this interest forward must have contributed enormously to the awakening of a general interest in mental measurement. In 1883 he wrote: "The instincts and faculties of different men and races differ in a variety of ways almost as profoundly as those of animals in different cages of the zoological gardens." ⁵ Galton was, of course, a eugenicist, and as such was interested in improving human stock, "thus exerting ourselves to further the ends of evolution more rapidly and with less distress than if events were left to their own course." Such a program naturally led to the consideration of means of measuring mental faculties.

His observations had led him to believe that "capacity for labor" and sensory acuity were two important abilities transmissible by descent. Perhaps his tests of sensory capacity, mentioned above, and his use of the dynamometer and tests of reaction time were outgrowths of these observations. Incidentally, the tests themselves proved to be quite inadequate as intelligence tests except at lower levels.

Another notable figure in the early history of mental testing was Cattell. Peterson has suggested that he was the first to employ the term "mental test." His most important contribution to mental testing lay in his standardization of procedure in administering and scoring the tests. Perhaps his interest in standardization of procedure influenced in a considerable measure his choice of tests. ⁶ Most of the tests employed by him were adaptations of experimental techniques that had previously found their way into psychological laboratories. Several such tests administered to 100 Columbia University freshmen, as described in an article pub-

⁴ F. Galton, "Remarks on Mental Tests and Measurements," *Mind*, 15 (1890), p. 380.

⁵ *Idem*, *Inquiries into Human Faculty and Its Development* (New York: E. P. Dutton and Co., 1883), p. 2.

⁶ J. Peterson, *Early Tests and Conceptions of Intelligence* (New York: World Book Co., 1925).

lished in collaboration with Farrand in 1896, were: keenness of vision and hearing, reaction time, afterimages, color vision, perception of pitch and weights, sensitivity to pain, color preferences, perception of time, accuracy of movement, rate of perception and of movement, memory, and mental imagery.⁷

In 1901 Wissler published the results of a statistical analysis of the Cattell-Farrand data. The intercorrelations between the tests were low, ranging from $-.28$ to $.39$. Theoretically, this in itself does not constitute a limitation to the tests. Ideally, such tests should correlate high with independent criteria and low with one another. Actually, this ideal has not been approximated very closely, because it has turned out that most tests that correlate high with the criteria also correlate high one with another. A more telling blow was Wissler's finding that the tests correlated to an indifferent degree with marks earned in academic subjects, although significant intercorrelations were obtained between the marks earned in the various subjects.⁸

It is clear now, although it was not so then, that Cattell sacrificed validity in the interest of precision of measurement. Other workers, notably Oehrn and Kraepelin (1889), had attempted measurement of the more complex mental processes, as, for example, perception, memory, and association.⁹ In 1906 Terman, in a study of the mental abilities of "bright" and "stupid" boys, made use of tests designed to measure such functions as (1) inventive or creative imagination, (2) logical processes, (3) mathematical ability, (4) language ability, (5) insight, and (6) memory.¹⁰

Binet. The genius of Alfred Binet was turned to intelligence testing in 1894, or shortly before, as is seen in several articles

⁷ J. McK. Cattell and L. Farrand, "Physical and Mental Measurements of the Students of Columbia University," *Psychological Review*, 3 (1896), 618-48.

⁸ C. Wissler, "The Correlation of Mental and Physical Tests," *Psychological Review, Monograph Supplement*, 3 (1901), Whole No. 16.

⁹ Cf. J. Peterson, *op. cit.*, Chap. V (New York: World Book Co., 1925).

¹⁰ L. M. Terman, "Genius and Stupidity: A Study of Some of the Intellectual Processes of Seven 'Bright' Boys and Seven 'Stupid' Boys," *Pedagogical Seminary*, 13 (1906), 307-73.

published in that year. Within this and the three succeeding years followed seven articles describing research conducted in collaboration with V. Henri, which appeared for the most part in *Revue Philosophique* and *L'Année Psychologique*. Experimentation was carried on with various tests designed to measure memory, mental images, imagination, attention, comprehension, suggestibility; and with various physiological and anthropometric measures. This experimentation was directed primarily toward determining the validity of the various tests. This was found by ascertaining the extent to which they discriminated between groups of bright and dull children as selected by independent means, principally by teachers' estimates and grade placement. For example, fifteen or twenty different physical measurements were made of a group of boys whose modal age was thirteen. It was found that the measures obtained were essentially unrelated to estimates of intelligence of the boys made by the head of the school. The tests of suggestibility likewise proved to be unsatisfactory. In fact, some of them gave negative discrimination.

Within the years 1894-1904 Binet published some thirty-five articles and treatises on intelligence and its measurement. In 1904 he was appointed by the Minister of Public Instruction to a commission to study the problem of teaching the subnormal pupils in Paris. The decision to place these pupils in special schools created a need for a convenient, dependable measure of intelligence. Binet addressed himself to the designing of such a test, in collaboration with T. Simon; and in 1905 the first Binet test made its appearance. This was not an age scale, as were the revisions in 1908 and 1911, but simply a collection of test items, thirty in number, ranked in order of difficulty, approximately, from those suitable to the mental ability of an infant to those suitable for adults. The upper limits of idiots, imbeciles, and morons, the three grades of the feeble-minded, were indicated. The characteristics of a mental-age scale are discussed under the next subhead.

The Binet-Simon tests, which marked the beginning of intelligence testing in the modern sense, are undoubtedly to be num-

bered among the most noteworthy contributions in the entire history of psychology. These tests, as Garrett appropriately remarks, are still the prototype of the best modern scales for measuring intelligence. Within a few years after their publication they were in extensive use in practically every major country in the world.

Binet's contributions to intelligence testing from 1904 to 1911 (the year of his death) are chiefly three. First, he succeeded in devising measures of the so-called higher mental processes, such as imagination, judgment, attention, insight, and reason. Second, he designed a measure of the general level of intelligence by making use of a fairly large battery of heterogeneous test items and deriving a composite score. He put into practice Galton's recommendation that shafts be sunk at certain critical points and that, in order to determine the points best suited to this purpose, the measures should be compared with an independent criterion. Third, Binet gave more exact formulation to the mental-age concept by basing it specifically on test scores.

Modern period in America. Wissler's monograph proved to be something of a setback to testing in America. When intelligence testing was revived, with Goddard's adaptation of the Binet-Simon scale in 1910, the movement went forward rapidly.¹¹ Kuhlmann's first revision of the scale appeared in 1912, Terman's Stanford-Binet in 1916. The latter has enjoyed exceptionally wide popularity and in 1937 set a new high standard in the "New Revision."¹² The second revision of Kuhlmann (1922) has proved to be a most satisfactory instrument,¹³ and his third scale (1939) has much to commend it.¹⁴ For a fuller account of the nature and the extent of these revisions, and for accounts of other well-

¹¹ H. H. Goddard, "The Binet-Simon Measuring Scale for Intelligence," *The Training School*, 6 (1910), 146-54.

¹² L. M. Terman and M. A. Merrill, *Measuring Intelligence* (Boston: Houghton Mifflin Co., 1937).

¹³ F. Kuhlmann, *A Handbook of Mental Tests* (Baltimore: Warwick and York, 1922).

¹⁴ *Idem*, *Tests of Mental Development* (Minneapolis: Educational Test Bureau, 1939).

known revisions, the student is referred to the books that deal exclusively with intelligence testing.¹⁵

Great impetus was given to intelligence testing during American participation in World War I. After the declaration of war a committee of seven psychologists, with R. M. Yerkes acting as chairman, undertook and carried to completion the construction of a battery of group tests of intelligence. Obviously, the task of administering tests individually to the drafted men was prohibitive.¹⁶

The well-known Army Group Examination Alpha in five forms was the principal contribution of the committee. In practically all important achievements—for example, the 1905 Binet-Simon scale—considerable preliminary work had gone before. The case at hand was no exception. The members of the committee drew from several sources, but from none so extensively nor with such profit as from the work of A. S. Otis, who had at the time a group test in manuscript form. The following captions will serve to give some indication of the type of test items utilized: following directions, arithmetical problems, practical judgment, synonym-antonym, disarranged sentences, number series completion, analogies, and general information. The Army Alpha battery has stood as a model for group intelligence tests to this day.¹⁷

The mental-age concept. The mental age was the first unit of measurement employed in intelligence testing. This may be characterized as follows: The MA corresponding to a given intelligence-test score is the average age of the standardization

¹⁵ Good sources are P. L. Boynton, *Intelligence, Its Manifestations and Measurement* (New York: D. Appleton-Century Co., 1933), Chap. V.; F. N. Freeman, *Mental Tests* (Boston: Houghton Mifflin Co., Revised 1939); and L. J. Cronbach, *Essentials of Psychological Testing* (New York: Harper and Brothers, 1949).

¹⁶ Cf. C. S. Yoakum and R. M. Yerkes, *Army Mental Tests* (New York: Henry Holt and Co., 1920), pp. 2-3.

¹⁷ For reviews of recent intelligence tests the reader is referred to D. B. Stuit, "Current Construction and Evaluation of Intelligence Tests," *Review of Educational Research*, 11 (1941), 9-24; and to O. K. Buros, *The Nineteen-Forty Mental Measurements Yearbook* (Highland Park, New Jersey). The Mental Measurements Yearbook, 1941, and issues in 1948 and 1953.

cases earning that score. Thus an appraisal of a pupil's performance on an intelligence test is made by ascertaining the average age of the pupils (standardization cases) whose performance equals his own and comparing this age with his. This is not strictly true on a test like the Stanford-Binet, where the original scores are in MA units.,

The mental-age concept appears to have been in the thinking of various writers well in advance of the advent of standardized intelligence tests. Woodrow informs us that Duncan and Millard appear to have had the concept in mind in 1866, as witnessed by the following: "It is a very striking method of showing the mental deficiency of a member of any one of these classes [of feeble-minded] to compare its mental gifts with those of children of perfect mind at younger ages."¹⁸ To the same purpose is the following statement by Down made in 1887:

In any given case we have to ask ourselves, can we in imagination put back the age two or more years and arrive thus at a time perfectly consistent with the mental condition of our patient? If he be a backward child we shall have no difficulty in saying what period of life would be in harmony with his state.¹⁹

Mental-Age Scales

In selecting items for a mental-age scale there are certain practical considerations, such as time limits, interest value, administration, and scoring, that must be taken into account. Once the test designer has assured himself that his test items meet these practical considerations and that they have proved validity, he is ready to proceed with the construction of a scale.

Standardization cases. One of the first steps is the selection of standardization cases, or the adoption of some principle by which they are to be selected. Here the task is to draw a sampling such that each age group is representative of that age group in the

¹⁸ H. Woodrow, *Brightness and Dullness in Children* (Philadelphia: J. B. Lippincott Co., 1919), p. 25.

¹⁹ *Ibid.*

general population. It is clear that if this sampling is superior in ability to the population in general, the scale will assign mental ages that are too low when put into use. The reverse will obtain if the standardization cases are inferior to the population in general.

In the New Stanford Revision a total of approximately 3000 standardization cases were used, making from 150 to 200 cases per age level for the years 2 to 5, from 201 to 204 cases for the years 6 to 14, and from 101 to 109 for the years 15 to 18. The cases between the ages 6 and 14 inclusive were drawn entirely from school populations. Wherever possible siblings of the school children were used as standardization cases for the preschool levels. An attempt was made to find schools patronized by people of average social status. These were chosen from various communities in several different states. Within each school all pupils, regardless of the grade in which they were placed, who were within one month of a birthday were made a part of the standardization group and were therefore tested by the trial battery. As a partial check on the representativeness of the sampling, data were secured as to the occupations of the children's fathers. The occupational distribution was found to compare rather well with that of the 1930 U. S. Census for employed males.

Administration of trial battery. The term "trial battery" is used here with some reservation. The test designer begins with a considerable knowledge of his test elements. As is seen above, Binet had behind him ten years of persistent research in the measurement of intelligence when he addressed himself to the task of constructing a scale. Concerning the New Stanford Revision the authors state: "Work on the revision was begun with a survey of the literature on the old Stanford-Binet and a study of every kind of intelligence test item that had been used or suggested."²⁰ By thorough acquaintance with the history of the test elements it is possible for a designer to know in advance a great deal about the merits of the elements that comprise the trial battery. But in a mental-age scale there exists the special problem of getting items

²⁰ L. M. Terman and M. A. Merrill, *op. cit.*, p. 7.

of the right degree of difficulty for each age level. For this reason, especially, the designer puts into his trial battery more items than he intends to use in the final battery. This procedure gives him some leeway in the location of items.

In the administration of the trial battery the procedure is carefully determined in advance and followed to the letter, just as is done in the use of the scale afterward. Moreover, the responses of the standardization cases, as made to each test element, are recorded verbatim. This is of the greatest consequence in the location of the elements.

Location of items. In a mental-age scale the norms are self-contained, as it were. In this respect it differs from a point scale. Since this is true, the proper location of items is just as essential to the construction of an accurate scale as is the selection of standardization cases. The fundamental problem is that of so locating the items that the median MA score equals the median CA of each age group of the standardization cases at each age level. If this is done precisely (in practice it has only been very closely approximated) the average IQ of the standardization cases will stand at 100. If this condition obtains and if the standardization cases are exactly representative at each age level, the average IQ of the general population in which the scale is subsequently used will also stand at 100, at each age level.

This arrangement is achieved by trial-and-error manipulation. In some instances an item can be moved to a higher or a lower age level. In other instances it may be made more difficult or less difficult by alteration in the scoring. For example, an item may be made more difficult by decreasing the time limit and, in some instances, by increasing the number of correct responses required for passing it.

Standardization. The principal feature of standardization of a test is the compilation of norms for the interpretation of scores. Implied features are standard procedures in administration and scoring. In practice the test is to be administered and scored exactly as with the standardization cases. If, in practice, the instructions and time limits are altered, or if the scoring is too

lenient or too exacting in comparison with those levied against the standardization cases, the results of careful selection of standardization cases and placement of items are vitiated. Consequently standardization procedure implies that detailed instructions be provided for administration and scoring.

As noted previously, in an age scale the norms are self-contained. The norms become a part of the construction of the scale. In a point scale the compilation of norms becomes an independent procedure.

In age scales the scoring is commonly subjective, to a degree. The examiner must evaluate the responses. In the opinion of some authorities this is a weakness. In this opinion the writer does not concur. If the tests are administered by competent, thoroughly trained examiners, there is something to be said in favor of allowing the examiner's judgment to figure in the interpretation of the responses.

Point Scales

The term "point scale" has two different significations in intelligence testing. On the one hand it is used to designate a type of scale in which varying amounts of credit are accorded the responses depending upon their merit, as originally used in the Yerkes-Bridges-Hardwick Point Scale. This practice opposes the all-or-none method of scoring employed in the Stanford-Binet scales. On the other hand, group tests and all other tests that do not arrange items according to the age-scale method, or express scores in years and months of credit earned are known as point scales. Upon administering such a test to a pupil the number of items answered correctly is ascertained, the number of points earned. This number becomes the pupil's raw score. Such a score, by a table of norms, is then converted, without difficulty, into an MA score or some other form of derived score.

The Kuhlmann tests. The Kuhlmann Individual Tests of Mental Development incorporate both features of the point scales. The test designer must exercise the same care in the selec-

tion of standardization cases for a point scale as for a mental-age scale. The norms are likely to be slightly more accurate than in the age scale because of the practical difficulty in achieving a precise location of the items in an age scale. As a matter of fact the location of items at appropriate age levels is not a necessary step in the construction of an age scale. Instead, the designer may find the age at which an item is passed by exactly 50 per cent of the standardization cases and assign the item that MA value.

Kuhlmann used the latter method. For example, for item 12 the age at which 50 per cent passed is 6.2; for item 13, 6.7, and so on. Certain variations were required for the scoring of many of the items, since partial credit was allowed. At the lower age levels, below the six-and-a-half-year level, the scoring is all-or-none, as in the usual Binet procedure. Above this point a variable amount of credit is allowed, depending upon the speed and the quality of the response.

Speed has been a controversial matter in intelligence testing since the advent of group testing, inasmuch as most group tests impose a rigid time limit. Thus the speed of response is a factor in determining the total score earned. A considerable body of psychological research has shown sheer speed of work—speed in tasks so simple that speed is the principal determinant of the total score—to be essentially unrelated to criteria of intelligence. However, Kuhlmann makes the important observation that “*having shown that a speed test is a poor test proves nothing whatsoever about the value of a speed score in power tests.*”²¹ Above the age level indicated previously, the time spent in making a response, as well as its accuracy, becomes a part of the score. The experimental results show that speed, instead of calling for little or no consideration, merits a weighting about equal to accuracy. The importance of the speed factor is shown further in the finding that the correlations between speed and accuracy scores are usually negative and often quite high. This finding, says Kuhlmann, shows “to what high degree speed and accuracy scores are

²¹ *Op. cit.*, p. 41.

mutually compensating.”²² In a sense, Kuhlmann proposes to secure a measure of intelligence based upon (1) how much the child can do and (2) how quickly he can do it. Performing a difficult and somewhat novel mental feat quickly signifies greater intelligence than performing the same feat slowly.

What we have in effect in an IQ is the ratio between the individual's obtained score and the average or expected score for his age. On a mental-age scale an MA of 7 is the expected score for a seven-year-old child. This permits us to use 7 as the expected score for a seven-year-old child. The obtained MA score is thus divided by 7. This yields the IQ. But in a point scale we do not need to take the step of determining the expected MA score. We can use IQ equivalent scores derived from the raw score.²³ The test designer can provide an IQ equivalent for each age level.

It has been argued on logical grounds that IQs derived from standard scores are more constant from year to year than IQs derived by dividing MA by CA. When mental-growth curves are derived by plotting CA (x axis) against standard scores (y axis) we get a curve that is slightly S-shaped, showing the fastest rise around the middle—from about CA 6 to CA 12. This is taken to signify that the MA units are not equal, but are greater in the middle range than on either side. It has been suggested that in the age range of most rapid mental growth mean IQs derived in the conventional way should run somewhat above 100 and at the periods of slower growth they should run below 100. This argument may or may not be convincing. The writer is inclined to believe the last suggestion. However that may be, IQs derived from MA scores are about as constant from year to year as those derived from standard scores. This is not to defend the mental-age-scale procedure as the best way to make an intelligence test, but to defend those tests which have already been made by this procedure.

²² *Ibid.*, p. 48.

²³ If we wished to convert raw scores into normalized standard scores, we could compute the percentile scores corresponding to the raw-score values and, by consulting the appropriate statistical table, ascertain the standard score corresponding to the various percentile-score points.

The Wechsler tests. The Wechsler tests consist of ten subtests, five verbal and five nonverbal, and a vocabulary test as an alternate. Originally, the tests, known as the *Bellevue Intelligence Tests*, consisted of an *adolescent scale* (CA 10-16) and an *adult scale* (CA 16-60).²⁴ The names of the subtests and the number of items and the maximum score are as follows:

BELLEVUE INTELLIGENCE TEST

<i>Verbal</i>	<i>No. of Items</i>	<i>Score Maximum</i>
1. General Information	25	25
2. General Comprehension	10	20
3. Arithmetical Reasoning	10	14
4. Digits Forward and Backward (memory for)	17	17
5. Similarities (In what way are Wood and Alcohol alike?)	12	24
<i>Nonverbal</i>		
6. Picture Completion	15	15
7. Picture Arrangement	6	21
8. Object Assembly	3	26
9. Block Design	7	42
10. Digit Symbol	1	67
Vocabulary	42	42

Subsequently there has appeared the Wechsler *Intelligence Scale for Children*, starting at age five. Several of the subtests on all three scales named provide variable credit for the responses, depending upon quality or speed, or both. The raw score is converted into a weighted point score. Charts are provided giving the IQs corresponding to weighted scores for each age level.

The Wechsler tests have several excellent features. The adult scale is standardized on adults rather than on adolescents. The obtained score of a man of forty is compared with the expected (mean) score of forty-year-old persons. Inherently, these tests should be more useful clinically than tests of the Binet type, since they are comprised of subtests of enough items of a kind to give

²⁴ D. Wechsler, *The Measurement of Adult Intelligence* (Baltimore: Williams and Wilkins Co., 1941).

the subtests a fair degree of reliability. As already mentioned, the nonverbal section of the test is quite a serviceable feature. These tests may well become a model for the construction of individual point scales, just as the Binet test has stood as a model for the construction of mental-age scales.

The PE of the IQ

The fact that when we obtain an IQ we obtain a score, a score expressed in IQ points, not "the IQ," has already been noted. We do not know what the hypothetical true IQ is, nor is there any way to ascertain it. However, we are not in a hopeless position, by any means. By knowing the reliability coefficients of a test, or by knowing the PE of the IQ (which is more or less equivalent to the same thing), at various IQ levels, *we can estimate the probability of the obtained IQs deviating from the hypothetical true IQ by more than given amounts.* As examples, the PE of the Stanford-Binet test at the IQ range 90-110 is approximately 3 IQ points; below 70 it is 1.49; above 130, 3.54. Incidentally, this tells us that low IQs are much more reliable than high ones. These PEs are equivalent to reliability coefficients of .92, .98, and .90, respectively. This is not very meaningful in a practical way until we know how many PEs are required at given levels of confidence. For the 50 per cent level of confidence (50 chances in 100) we must take 1 PE; 25 per cent level (75 chances in 100), 1.71 PE; 10 per cent level (90 chances in 100) 2.44 PE; 5 per cent level, 2.99; 1 per cent level, 3.82.

Now if we have a Stanford-Binet IQ of 70, and have reason to believe that the test was given under standard conditions, we can proceed to establish the confidence limits, for a given level of confidence. In school practice the 10 per cent level seems feasible. It is possible to determine an amount such that the chances are 90 in 100 that the obtained IQ will not deviate from the true Stanford-Binet IQ by more than this amount, plus or minus. The PE for IQ 70 is 1.49. For the 10 per cent level of confidence we must take 2.44 PEs, $1.49 \times 2.44 = 3.6$. Thus the limits for the

10 per cent level of confidence become 66.4 to 73.6. There are 10 chances in 100 that the true IQ lies outside the limits thus determined. Therefore the interval from 66.4 to 73.6 is known as the 90 per cent confidence interval. In school practice we are often more concerned with one side than another. In certain practices, such as selecting pupils for special classes for slow learners, we may not care, for purposes of selection, if the "true" IQ is below 66.4. We may only wish to establish an upper limit such that the probability that the true IQ is above this limit is some specified value, say 5 per cent. Here we could say that the chances are only 5 in 100 that it is more than 3.6 IQ points above the obtained IQ. Hence the value 73.6 is known as the limit of the one-ended 95 per cent confidence interval.

Let us take an example on the other side of the mean—a high-school senior who has earned a Stanford-Binet IQ of 125. Let us suppose that this student wishes to go to college and subsequently to enter a professional school. Let us take a PE of 3.2. The limits for the 50 per cent level of confidence are 121.8 and 128.2. His adviser may think that in terms of the student's objectives his "true" IQ should be at least as high as 118 or 120, and is interested only in the lower limits. The adviser could assume that there are 75 chances in 100 that it is not lower than 121.8; that there are 87.5 chances in 100 that it is not lower than 118.6, $125 - (2 \times 3.2) = 118.6$. He would probably conclude that in terms of intelligence the student's objectives are realistic. Suppose a student scoring 118 has similar objectives. Since this is about the minimum requirement, the adviser would want to be pretty certain that this score is not much above the hypothetical true score. This case would call for more careful consideration than the first one. The adviser might recommend some additional tests. He probably would want to consult the student's academic record and talk to some of his teachers and to secure any other information available. It should be understood that 118 is about the minimum for success on the average. All we can be sure of is that a student's chances of succeeding in such a program decrease

sharply as the score goes downward from this point, and the student will not have an easy time of it even if 118 is his "true" IQ.

Item Validity

As an illustration of the type of procedure applied to the determining of the validity of test items, attention is called to the work on the old Stanford-Binet scale.²⁵ The criteria against which the validity of the individual items are checked are as follows: (1), increase in percentage of children passing an item at the successive age levels; (2), coherency; and (3), correlation of individual items with an independent estimate of intelligence, such as teachers' ratings or grade placement.

The first criterion needs but little comment, except to say that it is a necessary but not a sufficient characteristic of a valid item. It is necessary in the sense that mental ability is known to increase with age. It is insufficient because measures other than those of intelligence may also show the same characteristic. For example, almost any anatomical measurement or test of strength shows an increase with age up to maturity, just as do measures of intelligence.

If the scale as a whole is known to have acceptable validity as shown by a satisfactory correlation with independent criteria, the third step, that of correlating each item with the criteria, may be dispensed with, and the second step made to serve for that purpose. This was done in the case in point. By the second step, coherency, is meant correlation of the individual items with the entire scale. As the authors say, if ten-year-old children who by the test have eleven-year-old intelligence do not pass an item with greater frequency than do ten-year-old children who test at nine-year-old intelligence, the item lacks validity if the scale as a whole is valid. For example, at age seven, for the test "naming the days of the week," 33 per cent of the standardization cases

²⁵ L. M. Terman, *et al.*, "The Stanford Revision and Extension of the Binet-Simon Scale for Measuring Intelligence," *Educational Psychology Monographs* (1917), No. 18.

with IQs below 96 passed the item; 62 per cent of those having IQs between 96 and 105 passed it; and 85 per cent of those having IQs above 105 made successful responses.

It is obvious that the validity of intelligence tests is assessed by checking them against fallible criteria. For this reason an indispensable factor in test construction is a great deal of good common sense based upon a great experience with tests. School marks as a criterion are somewhat lacking in reliability. But were they perfectly reliable they would still not be an infallible criterion of intelligence. One pupil may earn a better mark than another not because he is more able but because he works harder. Thus academic achievement is not a really valid criterion of intelligence, even when such achievement is accurately assessed. Industry, habits of work, ambition, and other factors besides intelligence contribute to academic attainment.

Validity of the IQ Concept

By validity of the IQ as a unit of measurement is meant the absence of systematic variations contingent upon age. We know that MA is not by itself a satisfactory unit of measurement, because its value changes with age. That is, an acceleration or a retardation of one year in MA at age 5 does not have the same significance as does acceleration or retardation of one year at age 10. Thus in interpreting an MA score it is always necessary to state the CA. The question of the validity of the IQ has nothing to do with the over-all validity of the test from which the IQs are derived. It refers only to the validity of the IQ, as a method of describing performance.

In the sense here used, the IQ is valid if its meaning can be generalized, if an IQ of a given value signifies the same degree of brightness at one age as at another. This condition can prevail only if the IQ is constant except for chance changes or other disturbances that are not of a systematic order. If as children grow older their IQs change systematically in one direction or the other, the IQ is not valid, according to the present usage.

For complete validity there must be an absence of systematic change at all IQ levels. Some writers, while accepting the validity of the IQ for children of average test intelligence, maintain that it lacks validity at both extremes. Specifically, they insist that dull children earn successively lower IQs as they grow older and that the reverse tendency obtains with respect to children of high IQs. Some experimental data are presented in Chapter VIII. Suffice it to say here that in terms of the data the issue is arguable. That absence of systematic change is any less a fact at the high and low levels than at the middle level has, in the writer's opinion, yet to be conclusively demonstrated. On a test that is well standardized this could not happen.

It should be pointed out that the IQ is somewhat lacking in validity at the adult level when it is determined by conventional procedure. Stanford-Binet IQs decline systematically for the age ranges above 25 or 30 years. This results from the fact that MA scores in adult life decline with age. Since in determining the Stanford-Binet IQ we use a constant CA of 15 for all age levels after 16, the IQs must decline. As has been noted, this limitation in validity does not exist with respect to the Wechsler tests, since by his method of test construction he can use the mean score the examinee attains at each level as the denominator. This does not mean that the Stanford-Binet test is necessarily a poorer test for older adults than for younger adults or children. As a matter of fact, adults show a steady decline in IQ on all intelligence tests except the Wechsler. Even Wechsler weighted raw scores show this decline, but by his method of standardization he was able to derive IQs that are valid—that is, free from systematic variation—up to the age of 60. However, decline in intelligence test performance after about 30 is a genuine phenomenon, just as increase in performance is characteristic of the period of growth. The IQ is really a measure of brightness. It describes a person's intellectual status in comparison with other persons of his own time of life in the general population.

There is another and very important facet to the concept at hand; namely, that any given IQ values, 70 or 130, for example,

must have the same meaning at successive ages, must signify the same degrees of brightness. Thus "validity of the IQ as a unit of measurement" demands that the standard deviations of the IQ must be the same, or nearly so, for the successive age levels. If, for example, at age 6 the SD is 16 IQ points and at age 10 it is 12, an IQ of 132 for a six-year-old would signify the same degree of brightness as an IQ of 124 for a ten-year-old. Each is two SDs above the mean. Similarly, 68 in the first case would equal 76 in the second. If SDs for the various age groups fluctuated widely, it would always be necessary to know the age of a child in interpreting his IQ score, because it would be systematically different at other ages. To the extent that this happens for a given test the IQ is lacking in validity.

The mean SD of the IQs on the Stanford-Binet test, ages 2 to 18, is a little over 16 IQ points. The average deviation of the SDs from their mean is about 1.6. In a few instances the deviation is rather large, as much as 4 points. While this is not enough variability to be very serious and is perhaps about as good as one could hope to achieve by the method of test construction employed, it would of course be desirable to avoid variability altogether. Wechsler came somewhat closer to this ideal.²⁶

Finally, it should be said that validity of the IQ in this sense implies nothing about the rate of mental growth beyond the fact that children tend to keep their relative positions. A child having an IQ of 80 grows .80 of a mental year, as measured, for each calendar year; but this does not imply that .80 of a mental year at 5 and at 10 are the same.²⁷

Validity of the MA Concept

The essence of the MA concept is that it enables us in the case of a dull child to think back to a younger child of normal mentality whose score matches his own; or in the case of a bright child,

²⁶ *Op. cit.*, p. 122-23.

²⁷ See M. W. Richardson, "The Logic of Age Scales," *Educational and Psychological Measurement*, 1 (1941), 25-34.

to think ahead to an older child of normal mentality whose score matches his own. If a child of 5 achieves the same average score as normal eight-year-olds, he is said to have an MA of 8; the same is true of an eleven-year-old child who achieves the same average score as normal eight-year-olds. Thus one could readily find in any of our large school systems children ranging in age from 5 to 11 all of whom have MAs of 8. The first question here raised concerns the comparability of these MAs. Are these MAs alike, except for chance differences? Or are there systematic differences as between bright and dull children, young and old, achieving the same MA scores, the same general averages? In the second place, do the children show systematic differences in academic achievement?

Kolstoe investigated the first of these questions in the following way.²⁸ By administering a group intelligence test for screening purposes he established a pool of bright, young pupils, and one of dull, older pupils. He then administered the Stanford-Binet test to the members of these two pools and upon the basis of the results formed matched bright-dull pairs in terms of estimated true MAs (corrected for regression effects), at four MA levels, as follows:

COMPARISON OF BRIGHT AND DULL CHILDREN

MA Level	MA Range	N Bright	N Dull
I	12.1-12.6	7	7
II	11.7-12.0	10	10
III	11.1-11.6	7	7
IV	10.7-11.0	5	5

The CA range for the bright group was 8.7 to 9.10; for the dull group, 14.2 to 16.3. Other data follow:

	Bright	Dull
Mean CA	9-2.5	15-5.4
Mean MA	11-3.2	11-3.0
IQ Range	116-138	72-84
Mean IQ	126.5	79.5

²⁸ O. P. Kolstoe, "A Comparison of Mental Abilities of Bright and Dull Children of Comparable Mental Ages," *Journal of Educational Psychology*, 45 (1954), 161-68.

The foregoing groups were established upon the basis of Stanford-Binet scores. The bright and dull children in the sample thus formed were then compared upon the basis of Wechsler subtests, including the alternate (vocabulary), and Primary Mental Abilities subtests. The results are shown in Table IX.

A companion investigation was conducted by Bliesmer on the same sample.²⁹ His aim was to compare the two groups on various reading and listening activities. His results, as well as Kolstoe's, are presented in Table IX.

TABLE IX
COMPARISON OF BRIGHT AND DULL PUPILS OF
COMPARABLE MENTAL AGES

Tests	Mean		Tests	Mean	
	Bright	Dull		Bright	Dull
WECHSLER			READING		
Information	14.17	14.07	Word Recognition	58.6	56.2
Comprehension	12.24	13.90 *	Word Meaning	30.4	30.8
Arithmetic	9.31	10.21	Memory for		
Similarities	11.55	12.03	Factual Detail	17.4	15.1
Vocabulary	34.90	34.24	Location of		
Digits	9.93	9.00 *	Factual Detail	15.8	12.7 *
Picture			Perception of		
Completion	11.97	11.28	Relationship	15.4	14.0
Picture			Recognition		
Arrangement	33.35	31.48	Main Ideas	16.3	13.9 *
Block Design	22.48	23.07	Inferences		
Object Assembly	21.52	22.48	Conclusions	14.9	12.9 *
Coding	36.10	48.55 *	Total Comprehension	79.8	68.4 *
PMA			Listening		
Number	15.39	44.12 *	Comprehension	30.6	23.6 *
Verbal	30.23	30.46	Reading Rate	61.6	55.4
Space	15.42	15.69			
Word Fluency	33.23	33.35			
Reasoning	14.23	16.65			
Memory	7.46	6.88			

* Signifies differences significant at the 5 per cent level of confidence.

²⁹ E. P. Bliesmer, "A Comparison of Bright and Dull Children of Comparable Mental Ages with Respect to Various Reading Abilities," *Journal of Educational Psychology*, 45 (1954), 321-31.

On the various subtests of the Wechsler and PMA tests there is little or no evidence of a trend in favor of either the bright or the dull group. On the various reading tests the differences generally favor the bright; and several of the differences are significant at the 5 per cent level. If bright and dull pupils of comparable MAs are strictly comparable in mental ability, as these results seem to suggest, one might expect the bright pupils to do somewhat better in reading situations and perhaps in certain other school subjects. This is suggested not because of superior mental capacity—bright and dull groups matched in MA seem to be equal—but because there are undoubtedly large social-class differences between the two groups. There should be more factors in the bright child's background favorable to successful schoolwork than are found in the dull child's background. Even so, the differences in obtained means are generally not large. Upon the basis of Bliesmer's data we would not expect bright children to be inferior in reading ability to older children of comparable MA, but perhaps somewhat superior.

Group Tests

The history of group intelligence tests is contemporaneous, more or less, with that of individual tests. The Army Group Examination Alpha, designed principally for use in World War I, is a landmark in this field. It appeared shortly after the original Stanford-Binet. There soon followed various group tests designed by Otis for all grade levels up to and including college.³⁰ These tests have had a long and useful history. They are still widely used. Soon there appeared the Kuhlmann-Anderson group intelligence tests, adapted to grades 1-12.³¹ Like the Otis tests, these have been widely used in schoolwork. More recently, the California Test of Mental Maturity has come into the field.³² It is adapted for all levels, through different editions, for all ages from

³⁰ Published by World Book Co., Yonkers.

³¹ Educational Test Bureau, Minneapolis.

³² California Test Bureau, Los Angeles.

the kindergarten to the adult level. The most recent addition to the group-test field is the Lorge-Thorndike Intelligence Tests, from kindergarten to college-freshmen level.³³

This is only a sketchy account of what is actually a long list of group tests. Each of the tests listed here and many of those not listed have various special features. For descriptions of the tests the student is referred to any of the recent standard works on psychological tests.³⁴

Group intelligence tests have proved to be quite satisfactory at all except possibly the youngest school-age levels. In fact, at the high-school and college levels some of the group tests are probably superior to the existing individual tests. However, in clinical work, and in most cases of pupils presenting special problems, there is no substitute for the individual psychological examination. Part of the superiority of the individual examination in such cases comes from the fact that the examination is conducted by a trained psychologist. Obviously, the big advantage in group tests is that they make it possible to examine in one test session an entire class rather than just a single pupil.

Group tests are designed on the point-scale principle, already described. The construction of such tests requires all the care demanded in the construction of a scale of the Binet type. Questions of validity, standardization, derivation of norms, selection of standardization cases, and reliability of obtained scores are just as crucial as in the construction of individual tests. There is one step involved in the construction of a Binet type of scale that is not involved in the construction of group or other point scales; namely, the locating of the test items at the proper CA levels. The test designer establishes his norms upon the basis of raw-score points. He can derive any kind of norms he wishes. For example, if he wishes to establish the MA equivalent of each raw-score value, he can do so by determining the average age of the pupils making that score. From these MAs, IQs can be derived,

³³ Houghton Mifflin Co., Boston, Mass.

³⁴ For example, L. S. Cronback, *Essentials of Psychological Testing* (New York: Harper and Brothers, 1949).

just as in a mental-age scale. Raw scores are, of course, not very meaningful until they are converted into some kind of derived score—MA, IQ, percentile, or standard score.

The problem of reading. Group intelligence tests vary a great deal with respect to the reading factor. Some of the tests are highly verbal and require a great deal of reading; some, for example the PMA, require very little reading. Some tests, such as the California Tests of Mental Maturity and the ACE *Psychological Examination*,³⁵ have both a verbal test and a nonverbal test, which are scored separately. While most group tests are rigidly timed, some, for example the Ohio State University Psychological Examination,³⁶ are not timed tests. However, on most group tests the score is that earned within a specified time limit. It is reasonable to suppose that a pupil who reads slowly would be at considerable disadvantage. So also would one who reads poorly, if his poor reading is of the class known as reading retardation (Chapter V). Are group tests unfair to such pupils?

The amount of research bearing upon this problem is not at all proportional to its importance. If the reading factor is important in the ways just suggested, this would make a good deal of difference in the way group tests are chosen and the results used. There is a rather high correlation between group-intelligence test scores and reading scores (Chapter V). The magnitude of the correlation coefficients will vary from investigation to investigation, depending upon the nature of the sample of pupils, the reading tests, and the intelligence tests used. Perhaps an average of the obtained coefficients would fall between .65 and .70. Correlation coefficients do not signify cause-and-effect relationships. This rather high relationship does not tell us that the intelligence scores are influenced to any large extent by reading ability. It may just as well be that reading scores are influenced to a large extent by intelligence. A priori, we would expect that there is a bit of both. It is significant that the relationship between reading scores and individual intelligence-test scores in which read-

³⁵ Educational Testing Service, Princeton.

³⁶ Science Research Associates, Chicago.

ing is scarcely a factor is also rather high, but probably not quite so high as when group intelligence tests are used. Thus the fact that reading scores and intelligence scores are rather highly related does not tell us the extent to which intelligence scores are biased by reading ability, or whether or not they are biased.

There have been a few attempts to assess the effects of special programs of reading instruction upon intelligence scores. In general the results have been inconclusive.³⁷ Logically, we would expect the effect to depend upon a number of factors. It might be considerable on certain types of intelligence tests and in the case of pupils presenting certain types of reading disabilities. Some average and bright pupils are very poor readers; indeed a few such can scarcely read at all. Some pupils who show excellent reading comprehension are extremely slow readers. For the latter we would expect training in speeded reading to lead to an improvement in scores on timed intelligence tests that demanded a considerable amount of reading. Also we would anticipate that as a result of successful instruction in reading average and bright pupils with special reading disabilities would show improvement on most group intelligence tests. For pupils in general we would not expect special programs of reading instruction to make a great deal of difference.

Rummel has attacked the problem of the effect of reading upon group intelligence scores in another way.³⁸ He administered the Kuhlmann-Anderson Intelligence Test, Revised Fifth Edition, Grade IX to maturity level, to about 700 9th- and 10th-grade students. The sample was divided into two equal groups. To one group the subtests were administered in standard time; that is,

³⁷ J. W. Hawthorne, "Effects of Improvement in Reading Ability on Intelligence Test Scores," *Journal of Educational Psychology*, 26 (1935), 41-61; C. M. McCullough, "Relationship between Intelligence and Gains in Reading Ability," *Journal of Educational Psychology*, 30 (1939), 688-92; G. M. Blair and J. F. Kamman, "Do Intelligence Tests Requiring Reading Ability Give Spuriously Low Scores to Poor Readers at the College Freshman Level?" *Journal of Educational Research*, 36 (1942), 280-83.

³⁸ J. F. Rummel, "The Effect of Reading upon Group Intelligence Test Scores," Master's Thesis, State University of Iowa, 1947.

according to the time limits specified in the *Instruction Manual*; to the other group the subtests were administered in twice the standard time. He also administered the Traxler Silent Reading Tests to both groups.

Basically, Rummel's problem was to determine whether or not differences in Kuhlmann-Anderson scores between the group that observed the standard time and the group that was allowed twice the standard time were a function of reading performance. Actually, the gain in the intelligence scores from the increased time allowances was not so great as one might suppose:

DIFFERENCES IN TIMED READING PERFORMANCES

<i>Group</i>	<i>Mean Score</i>	<i>SD</i>
Standard-time	MA 190 mos	24.09
Extended-time	MA 212 mos	31.82
Standard-time	IQ 106	15.44
Extended-time	IQ 118	18.76

First let us compare, with respect to the two time conditions, a group of students who made low scores both in reading rate and in reading comprehension. The mean MA scores in months are as follows:

Standard-time subgroup 165
Extended-time subgroup 166

For a group low in rate and average in comprehension the comparisons are:

Standard-time subgroup 186
Extended-time subgroup 199

For a group high in reading rate and in reading comprehension the comparisons are:

Standard-time subgroup 226
Extended-time subgroup 257

These results do not, of course, prove that poor readers are not handicapped on the Kuhlmann-Anderson test. They do, however,

suggest that their difficulty is not merely one of the time restrictions of the test. Given twice the standard time, the group of poor, slow readers scarcely improved at all. What we would really like to know is how such pupils would score on an individual psychological examination, such as the Wechsler or the Stanford-Binet, as compared with their performance on a group test. It is noteworthy that the pupils who performed best on the Traxler reading test, both in rate and in comprehension, benefited most from the extended-time condition. This at first suggests that good readers have the advantage on a Kuhlmann-Anderson type of test. It may well be that this outcome is a function of greater mental powers in general, associated with good reading performance. The same result might show up on timed intelligence tests that do not require any reading at all; for example, on the ACE nonverbal scale.

For the time being it is suggested that the only students seriously discriminated against on timed group intelligence tests are those who read slowly but enjoy good comprehension.

There is the possibility, as Durrell pointed out several years ago, that the presence of a reading factor in intelligence tests actually improves the test's predictive powers, so far as academic achievement is concerned.³⁹ This seems reasonable, upon the assumption that differences in reading ability, which may put the student at an advantage or a disadvantage on an intelligence test, may also put him at an advantage or a disadvantage in his work in school. Intelligence and reading ability are both correlated with academic achievement.

The speed-power issue. This issue arises in connection with any timed test or subtest. It is more commonly associated with group intelligence tests, since time limits is one of their common features. In mental measurement, speed tests and power tests represent one system of classification. Technically, a speed test is made up of items of equal difficulty, so that speed is the main variable. A power test is one in which the items increase in diffi-

³⁹ D. D. Durrell, "Influence of Reading on Intelligence Measures," *Journal of Educational Psychology*, 34 (1933), 165 ff.

culty in an ascending scale and in the answering of which the pupil is given unlimited time, so that power not speed is the limiting factor in the score. An example of this kind of test is the IER scale CAVD. In practice, most group intelligence tests combine speed and power in that the items vary in difficulty and a strict time limit is imposed. However, it is possible for such a test to be so designed that the time limit loses much of its effectiveness in the sense that the earned scores are not changed materially when unlimited time is given. In fact this appears to be the case with respect to some tests.

Power is not necessarily eliminated in a test the items of which are of equal difficulty. It may be pretty largely eliminated in a test the items of which are so easy as to place little or no premium upon intellectual ability, as in rate of tapping or color naming. But if the items are sufficiently difficult to tax the intellectual ability of the subjects taking the test, power is necessarily involved even if the items are of equal difficulty, because it is power that enables a subject to react to them quickly. Power upon the part of a subject makes the items easy, with the result that he proceeds quickly; lack of power makes the items difficult, with the result that he proceeds slowly. Thus speed and power have a legitimate meaning insofar as they pertain to the mechanical construction of a test; but these mechanical arrangements have no necessary psychological significance. Moreover, when we talk about a test with items of equal difficulty, it should be kept in mind that this is only an average determination. It is obviously impossible to construct a test in which each item has the same degree of difficulty for each person taking the test, or for any given person taking it.

In the attempt to determine whether group intelligence tests are predominantly speed or power tests, correlations have been computed between the scores earned in standard testing time and those earned in two and even three times standard time. Without exception the correlations obtained have been very high, almost as high as those obtained between two sets of scores earned in

standard time. This means that the examinees tend to maintain their relative positions when the time allowance is doubled or trebled.

The latter finding is a very important one. Although it does not necessarily prove that the tests in question are primarily speed tests or primarily power tests (both claims have been made), it does spike the shallow criticism to the effect that were longer time allowances given, the end results would be radically different.⁴⁰ In all probability speed and power, on power tests or on any tests of sufficient difficulty to tax the ability of the subjects, are highly correlated. While the findings with respect to variable time limits do not argue conclusively that the tests are primarily speed tests or power tests, they do argue that the tests are not necessarily poor tests because of the time limits. It is interesting to note that fairly high correlations have been obtained, about .85, between the Army Alpha, a timed test, and the IER scale CAVD, a test of unlimited time allowances. Perhaps a more crucial issue is whether scores on a timed test correlate more highly or less highly with the test criteria than do scores earned on a test without time limit.

ADDITIONAL REFERENCES

- Bischof, L. J., *Intelligence, Statistical Conceptions of Its Nature* (Garden City: Doubleday and Co., 1954)
 Brown, G. L., "On the Constancy of the IQ," *Journal of Educational Research*, 44 (1950), 151-53
 Johnson, Jr., G. B., "Factors to be Considered in the Interpretation of Intelligence-Test Scores," *Elementary School Journal*, 54 (1953), 145-50

⁴⁰ C. C. Brigham, *A Study of American Intelligence* (Princeton: Princeton University Press, 1923); G. M. Ruch, "The Speed Factor in Mental Measurements," *Journal of Educational Research*, 9 (1924), 39-45; *Idem* and W. Koerth, "'Power' vs. 'Speed' in Army Alpha," *Journal of Educational Psychology*, 14 (1923), 193-208; M. A. Tinker, "Speed in Intelligence," *Journal of Applied Psychology*, 18 (1934), 189-96; C. M. Tryon and H. E. Jones, "The Relationship between 'Speed' and 'Altitude,'" *Journal of Experimental Psychology*, 16 (1933), 98-114.

- Mech, E., "Item Analysis and Discriminative Value of Selected Wechsler-Bellevue Subtests," *Journal of Educational Research*, 47 (1953), 241-60
- Patterson, C. H., *The Wechsler-Bellevue Scales; A Guide for Counselors* (Springfield, Ill.: Thomas, 1953)
- Ross, C. C., and Stanley, J. C., *Measurement in Today's Schools* (New York: Prentice-Hall, Inc., 3d ed., 1954)
- Shaw, D. C., "A Study of the Relationships between Thurstone Primary Mental Abilities and High School Achievement," *Journal of Educational Psychology*, 40 (1949), 239-49
- U. S. Department of Health, Education and Welfare, *Basic Body Measurements of School Age Children, prepared by W. Edgar Martin* (Washington, D.C.: Government Printing Office, 1953).
- Wheeler, L. R. and V. D., "The Relationship between Reading Ability and Intelligence among University Freshmen," *Journal of Educational Psychology*, 40 (1949), 230-38

VIII

MENTAL AND PHYSICAL GROWTH

Facts and Correlates

THE DISCUSSION OF MENTAL GROWTH presents quite a different problem from that of physical growth. We may express A's height by saying he is as tall as the average eight-year-old boy. If someone wishes to know how tall the average eight-year-old boy is, we can supply the answer in inches or centimeters. We also express A's intelligence if we say it equals that of the average eight-year-old child. But we have no answer to the question as to how much this is, other than that it is whatever the average eight-year-old children has.

We do not know at all that MA units of 7, 8, 9 or 10, are equal. Such evidence as we have suggests that they are unequal. We are not in any better position, so far as this issue is concerned, if we dodge MA units, and simply say that A exceeds 80 per cent of his own age group, or express his intelligence in an IQ score derived by dividing his earned score by the expected score for his age.

At the practical level of describing a child's intelligence, actually his performance on intelligence tests, this issue is not particularly disturbing. MA, IQ, percentile, and standard scores are perfectly meaningful expressions, and are stable measures through successive years as the child grows to maturity. Difficulty arises when we undertake to talk about the rate of mental growth,

or the shape of mental-growth curves. We have already defended the MA as a unit of measurement and the IQ derived from it. If an MA scale were standardized perfectly, we should obtain a linear relationship between CA and MA, for the standardization cases. Apparently this procedure is perfectly justifiable as a means of deriving intelligence scores; but the linear relationship between MA and CA does not tell us anything about the shape of the mental-growth curve. We know that growth curves for height are nonlinear when inches are plotted against CA. However, were we to convert inches into height-age norms and plot HA against CA, we would obtain a curve showing a linear relationship. We cannot fall back on raw-test-score data, as we may do for inches or pounds in plotting physical-growth curves. It is precisely because we do not have a metrical scale for mental growth that we have to resort to derived scores in the first place.

The use of standard scores in plotting intelligence-growth scores is somewhat more defensible on logical grounds. Thurstone's method of absolute scaling has yielded curves of the general shape of that shown in Figure 5, for several different intelligence tests.¹ This is not represented as "the" intelligence growth curve, but as the curve obtained for the Stanford-Binet test by this method of scaling.

Age of mental maturity. While the ascertainment of the true shape of the intelligence-growth curve has presented an illusive problem, we do know a great deal about intellectual-growth phenomena. Several of the more important facts are discussed here. The first of these is the age of mental maturity—the age at which persons in the general population cease to show yearly increments in performance on intelligence tests, existing tests. Generally speaking, intelligence tests have been designed primarily for youth. It is conceivable that had tests been designed with the adult in mind a somewhat longer period of growth might have

¹ L. L. Thurstone and L. Ackerson, "The Mental Growth Curve for the Binet Tests," *Journal of Educational Psychology*, 20 (1929), 569-83. Figure 5 is reproduced from J. B. Stroud, *Educational Psychology*, by courtesy of The Macmillan Company, the publishers.

been indicated. In general terms it may be said that test maturity, and, operationally, intellectual maturity, is not reached earlier than about 20 years of age. This conclusion is not necessarily out of harmony with the practice of taking 15 or 16 as the average adult MA, as a practical expedient in measurement.

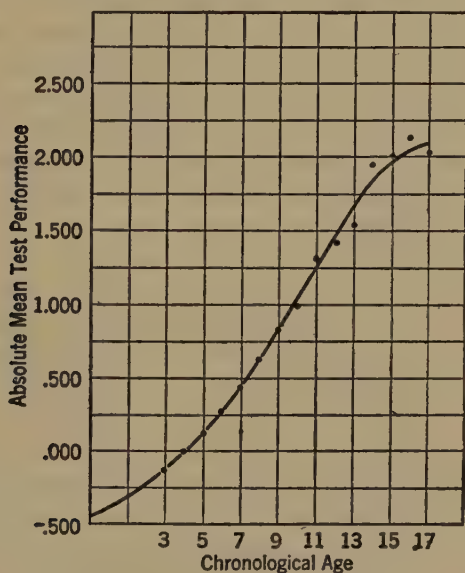


Fig. 5. Intelligence-Growth Curve

Several years ago Thorndike examined several thousand representative high-school pupils ranging in age from 13 to 19, and re-examined them a year later. Practice effects were eliminated by means of a control group. Significant increments in test scores were obtained between the first and second testing, allowances being made for practice effects, at all age levels, affording evidence of increased scoring power with age up to 19.² These

² E. L. Thorndike, "On the Improvement in Intelligence Scores from Fourteen to Eighteen," *Journal of Educational Psychology*, 14 (1923), 513-16, Id. "On the Improvement of Intelligence Scores from Thirteen to Nineteen," *Journal of Educational Psychology*, 17 (1926), 73-76.

findings were confirmed by Freeman and Flory.³ The latter made use of what is known as the longitudinal method, namely, that of examining the same children year after year. This method eliminates a problem inherent in the cross-section method, that of making sure that the age samples are drawn from comparable segments of the general population. This is not, however, an insurmountable problem. All standardization procedures in intelligence testing are predicated upon the comparability of the successive age samples. However, this condition is not very difficult to achieve. At least there are no theoretical difficulties inherent in the cross-section method. However, for purposes of determining individual differences in development of test intelligence the longitudinal method has obvious advantages. Freeman and Flory's subjects were examined yearly, on or about their birthdays, from 8 to 17 years of age, a few cases (26), from 8 to 19.

In the two foregoing investigations yearly increments are expressed in raw score points. These may be quite unequal in value. A difference of 10 score points at one position on the scale may be smaller or greater than a difference of 10 score points at another position. Scaling techniques have been utilized in an effort to overcome this difficulty, as in Thurstone's method of absolute scaling.⁴ Jones and Conrad, going a step farther, have transformed the absolute scores into percentages of adult achievement. Figure 6 presents an intellectual-growth curve derived by them from an application of the foregoing treatment to three sets of data, as indicated. The reader will observe that this is the curve for approximately the upper half of the measurable growth period. The authors make the point that 50 per cent of adult status is reached at age 11 or shortly thereafter.⁵

³ F. N. Freeman and C. D. Flory, "Growth in Intellectual Ability as Measured by Repeated Tests," *Society for Research in Child Development*, Monograph, Vol. 2 (1937), No. 2.

⁴ L. L. Thurstone, "A Method of Scaling Psychological and Educational Tests," *Journal of Educational Psychology*, 16 (1925), 433-51.

⁵ H. E. Jones and H. S. Conrad, *Adolescence, Forty-third Yearbook*, National Society for the Study of Education, 1944, Part I, p. 153. Quoted by courtesy of the publishers.

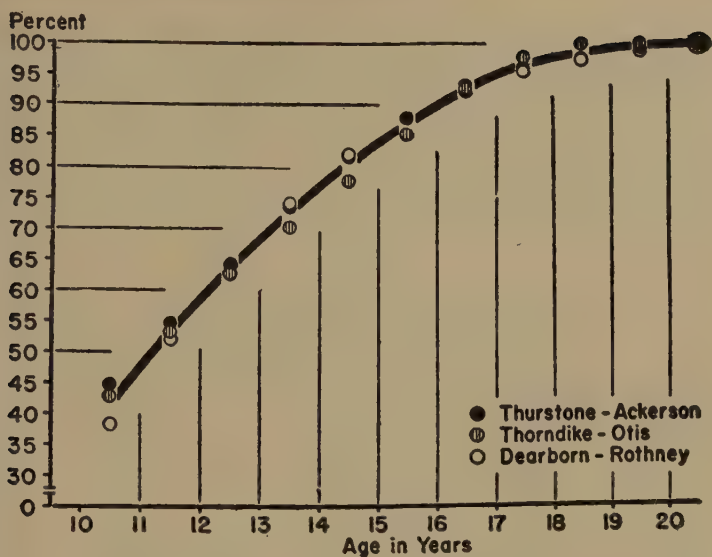


Fig. 6. Mental-Growth Curves in Percentage of Mature Status

Continuity of intellectual growth. In thinking of this matter we should keep in mind the fact that intelligence tests are not completely reliable. If the tests yielded reliability coefficients of 1.0 and if there were no changes in rate of mental growth from childhood to maturity, we should obtain correlation coefficients of 1.0 between scores obtained 1, 5, 10, or 15 years apart. Actually, except for the earliest years, up to 3 or 4, we obtain coefficients on the order of .80 to .90 between scores earned on tests taken several years apart.⁶ If such tests were given a day or a week apart, or within a period too short to permit any real change in mental growth, we would find coefficients of about .92, on the average; in other words, the tests have reliabilities of about .92. Thus it is seen that a considerable proportion of the

⁶ H. E. Jones, "Environmental Influences on Mental Development," in *Manual of Child Psychology*, ed. by L. Carmichael (New York: John Wiley, 1946), pp. 582-632.

deviation from 1.0 between examinations given several years apart is accounted for by lack of test reliability.

Bayley has recently published the results of an eighteen-year study of certain growth factors.⁷ Table X shows the correlations between various intelligence-test scores earned on tests administered at 1 month, 6 months, 1 year, 2, 3...17 years, and the Wechsler-Bellevue IQs earned at 18 years. It is seen that correla-

TABLE X
CORRELATIONS BETWEEN EARLIER MENTAL-TEST SCORES
AND WECHSLER-BELLEVUE IQ AT 18 YEARS

Age	Test	N	r
Mo. 1	California First-Year Scale	36	.07
6	California First-Year Scale	36	-.12
Yr. 1	California First-Year Scale	35	.25
2	California Preschool Scale	36	.55
3	California Preschool Scale	36	.49
4	California Preschool Scale	34	.66
5	California Preschool Scale	36	.76
6	1916 Stanford-Binet	36	.77
7	1916 Stanford-Binet	36	.81
8	1937 Stanford-Binet, L	36	.85
9	1937 Stanford-Binet, L	34	.87
10	1937 Stanford-Binet, M	36	.86
11	1937 Stanford-Binet, L	35	.93
12	1937 Stanford-Binet, M	34	.89
13	Terman-McNemar, C	31	.93
14	Stanford-Binet, L	33	.89
15	Terman-McNemar, D	33	.88
16	Wechsler-Bellevue	36	.94
17	Stanford-Binet, M	36	.90

tions between scores obtained on tests administered eight or ten years apart are about as high as those obtained on tests one year apart. Another notable fact is the low correlations obtained between scores earned at the youngest ages and their IQs at 18. It has been known all along that scores made by children at 6,

⁷ N. Bayley, "Some Increasing Parent-Child Similarities during the Growth of Children," *Journal of Educational Psychology*, 45 (1954), 1-21. The tables and the figure are reproduced by courtesy of the *Journal*.

12, 18, or 24 months do not correlate to any substantial extent with scores earned at 30 or 36 months. It has been a question as to whether these low correlations should be attributed to the instability of mental growth at this period in life or to inadequacies of our tests for these age levels. In any event, Bayley's results are not surprising.

It is also of interest that the same tendency appeared with other measures. Figure 7, taken from Bayley's work, shows the correla-

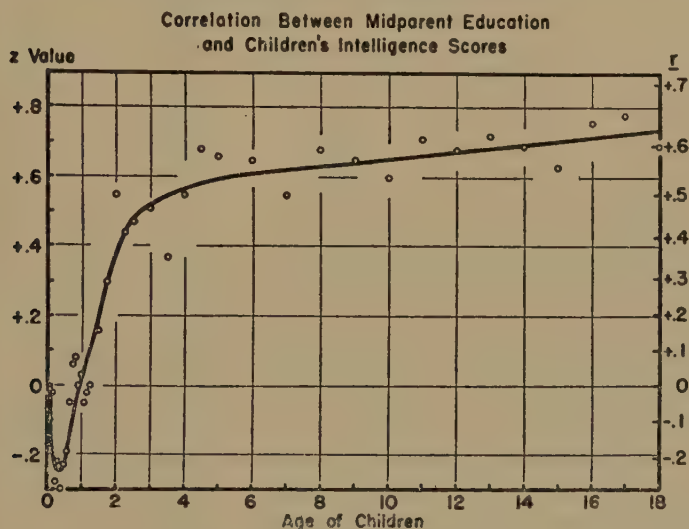


Fig 7. Correlations between Children's Intelligence Sigma scores and the years of schooling (average of mother and father) of the parents are plotted by age. Z-values are shown at the left, correlation coefficients at the right.

tions, for successive age groups, between mental test scores of children and mid-parent education (average years of schooling of the two parents). The relationship is extremely low at the youngest levels. This again may be due to deficiencies of our intelligence tests at these levels. However, this could scarcely be the explanation for the tendency for correlation coefficients be-

tween the height of children and the height of their parents to be quite low at the earlier age levels and to increase with the age at which the measurements of the children are made. Table XI reproduces, in part, Bayley's correlations between height of boys and of girls and mid-parent height.

TABLE XI
CORRELATIONS BETWEEN MID-PARENT HEIGHTS
AND HEIGHTS OF THEIR CHILDREN

<i>Age</i>	<i>N</i>	<i>Boys</i>	<i>N</i>	<i>Girls</i>
Mo. 1	24	.21	25	.46
3	32	.24	30	.42
6	32	.35	29	.61
Yr. 1	29	.39	26	.67
2	27	.36	23	.66
5	23	.50	24	.60
8	24	.58	24	.59
11	25	.60	21	.58
14	20	.82	17	.66
17	20	.77	20	.67

Some facts of physical growth. We have seen that there is a certain stability in mental growth. A child who is going to be bright when he grows up tends to be correspondingly bright at 5, 10, or 15. Similarly, there is a certain stability in physical growth with respect to any given measure of it, such as height, weight, or iliac width. A child who is going to be large or small at maturity is large or small all along relative to others of his age.⁸ Bayley reports correlations between children's heights and weights at infancy and at yearly periods from 1 to 18 years and height and weight at maturity.⁹ Some of these are reproduced in Table XII.

Thus it is seen that both mental growth and physical growth tend to be regular and continuous, except for the youngest age levels. Rate of growth is probably governed by both hereditary

⁸ H. V. Meredith, "The Prediction of Stature of North European Males through the Elementary School Years," *Human Biology*, 8 (1936), 279-83.

⁹ *Op. cit.*

TABLE XII
CORRELATIONS BETWEEN MEASURES OF
MENTAL AND PHYSICAL GROWTH

Age	Height				Weight			
	Boys		Girls		Boys		Girls	
	N	r	N	r	N	r	N	r
Mo. 1	18	.64	20	.37	19	.19	23	.51
6	22	.72	21	.58	23	.32	21	.40
Yr. 1	21	.72	19	.65	23	.26	22	.51
6	21	.88	19	.85	22	.42	24	.79
12	21	.88	19	.77	20	.58	23	.78
16	21	.79	19	.99	22	.65	22	.95

and environmental factors. Heredity is of course constant throughout the growth period. While environmental factors may change, sometimes radically, they probably remain fairly constant for most children. These two factors should ensure stability and continuity to growth.

However, we must not posit a central growth factor that all growth processes must obey and obey alike. As will be seen presently, there is little relatedness between physical and mental growth, except for a spurious relationship that results from the fact that both of these growth processes are correlated with elapsed time. Moreover, among the physical traits there is no necessity for children to grow proportionally in all traits. There is, however, an over-all tendency for the various measures to be intercorrelated. The intercorrelations will be quite high, spuriously high, if CA is not held constant. In one investigation, with CA held more or less constant, a correlation of .57 was obtained between height age and weight age scores; between HA and dental age, .24; and between WA and DA, .10.¹⁰ Dearborn and Rothney obtained an average intercorrelation of about .57 among standing height, weight, iliac, chest depth, and chest width.

¹⁰ P. Blommers, L. Knief, and J. B. Stroud, "The Organismic Age Concept," *Journal of Educational Psychology*, 46 (in press 1955).

These intercorrelations for 536 sixteen-year-old boys are shown in Table XIII. This table also shows the correlations obtained between intelligence scores and the respective measures of physical growth.¹¹ Lowell and Woodrow reported a correlation of .20

TABLE XIII
CHILDREN'S EARLIER HEIGHTS AND WEIGHTS CORRELATED
WITH THEIR OWN MATURE HEIGHTS AND WEIGHTS

	<i>Standing Height</i>	<i>Weight</i>	<i>Iliac</i>	<i>Chest Depth</i>	<i>Chest Width</i>
Intelligence	.224	.137	.078	.060	.138
Height		.676	.591	.461	.484
Weight			.700	.652	.717
Iliac				.463	.560
Chest Depth					.455

between carpal age and number of permanent teeth.¹² Gates obtained coefficients between carpal scores and lung capacity of .30, and strength of grip of .25; between strength of grip and height, .45, and weight, .40, and lung capacity, .46.¹³ The foregoing supports Paterson's observation: "Various aspects of physical growth are shown to be far from unitary."¹⁴

Relationships among mental, physical and educational development. The ability to learn is one of the principal things meant by "intelligence." When we speak of bright seven-year-old children, for example, we usually have in mind those who learn quickly or those who can achieve at a level not attainable by others at their age. Conversely, dull children are those who progress slowly in academic subjects. Relationships between in-

¹¹ W. F. Dearborn and J. W. M. Rothney, *Predicting the Child's Development* (Cambridge, Mass.: Sci-Art Publishers, 1941, p. 270). Reproduced by courtesy of the publishers.

¹² F. Lowell and H. Woodrow, "Some Data on Anatomical Age and Its Relation to Intelligence," *Pedagogical Seminary*, 19 (1922), 1-15.

¹³ A. I. Gates, "The Nature and Educational Significance of Physical Status and of Mental, Physiological, Social, and Emotional Maturity," *Journal of Educational Psychology*, 15 (1924), 329-58.

¹⁴ D. G. Paterson, *Physique and Intellect* (New York: Appleton-Century-Crofts, 1930).

telligence scores and achievement scores are not by any means perfect. The measures are not perfect, motivation upon the part of pupils is highly variable, and so is the experience they bring to a learning task. Some of the more comprehensive achievement tests, such as the Stanford Achievement Tests, will correlate with intelligence-test scores up to about .85. Correlations between intelligence scores and school marks, and between intelligence scores and scores on tests in a single subject such as reading and spelling, will be considerably lower. But there is no doubt that the highest achievement in a class is made in general by the brightest pupils and that the lowest achievement is made by the dullest pupils.

Is there any relationship between physical-growth measures and either mental-growth or achievement measures? Can a better prediction of pupil achievement be made by taking into consideration physical growth in addition to mental growth? It is a common practice to evaluate a pupil's progress in school in terms of his mental ability. Average achievement is satisfactory for a pupil of average ability; it is not satisfactory for a pupil of superior ability. Should height, weight, chest depth, number of permanent teeth, bone ossification, strength of grip, lung capacity, be taken into account also? Of course the school is interested in many ways in physical growth. It makes a difference in the happiness and well-being of children. It may even make a difference in their social development. But the question before us at the moment is whether or not physical development is related to mental development and to scholastic achievement.

We have already seen that mental and physical growth are related spuriously. It is the nature of growth that it takes time. The growth factors we are interested in here begin in infancy and continue to maturity. Ten-year-old children have advanced farther with respect to them than seven-year-old children. They are taller, have larger MAs, can read and spell better, and they wear bigger shoes. In fact we would find a positive and rather high correlation between MA and size of shoe for a random sample of grade-school pupils. This does not tell us that physical-

growth measures are related to intelligence or to achievement. We need to know whether or not there is a relationship among these growth factors for children of the same age, as there is between intelligence and achievement at a given age.

Research on this problem dates back to about 1900. Scores of investigations have been published. Generally they have yielded correlation coefficients at or near zero. It is true that extremely bright children are slightly better developed physically than children in general, and that extremely dull ones are slightly underdeveloped. But for a random sample of children of a given age the relationships are generally found to be negligible. Height and weight have rather consistently correlated with intelligence scores, to an extent of about .20, on the average. When the sample is large, a coefficient of .20 is statistically significant; that is, it signifies a relationship greater than zero. But coefficients of this magnitude have little practical significance. They improve prediction not more than 2 per cent above chance.

Some writers have suggested that higher coefficients of correlation would be obtained if various physical-growth measures were combined, as in multiple correlation procedures. As noted in Table XIII, Dearborn and Rothney obtained correlations between intelligence and various physical measures as follows: standing height, .224; weight, .137; iliac, .078; chest depth, .060; and chest width, .138. The multiple correlation obtained between intelligence and these five physical measures is $R = .247$. In a recent investigation reading scores and arithmetic scores were correlated, in a multiple correlation procedure, with MA, HA, WA, and DA.¹⁵ The results are as follows:

READING AND ARITHMETIC SCORES

	MA alone	MA, HA	MA, HA WA	MA, HA, WA, DA
Reading	.6451	.6508	.6543	.6592
Arithmetic	.5507	.5520	.5559	.5560

¹⁵ Blommers, *et al.*, *op. cit.*

Thus the addition of the three physical measures increased the correlation coefficient between reading and MA and arithmetic and MA by approximately .01, an amount that has neither statistical nor practical significance. These results are in agreement with those of Gates obtained in 1924.¹⁶ He obtained a coefficient of .60 between MA and certain educational achievement scores. A multiple correlation involving, in addition to MA, bone ossification ratio, height, weight, chest girth, lung capacity, grip, and nutritional status, raised the coefficient to .63.

There is a point of view in education, usually referred to as the *organismic age* concept, that holds that school achievement is a function of *total* growth—not total mental growth, but mental growth plus physiological and anatomical growth. This view holds that a child's readiness for reading or for long division, for example, is a function not only of his mental development but of his physiological and anatomical development as well. This thesis seems to say that within any given age level achievement is correlated with physical growth; that by adding physical measures to intelligence measures we increase the correlation with achievement over what we would obtain by using intelligence scores alone. The data presented in these paragraphs lend no support to this thesis. The problem has also been attacked in another way; namely, by the method of component analysis. This method, in a general way, analyzes into its component parts the total variation among all the growth measures available for all individuals in a sample, and provides an estimate of the total variation that may be ascribed to each part. As this method was applied here, one component reflected variation among the means of the various growth measures from individual to individual; the second component, the variation among the measures within individuals. This analysis has been carried out for a restricted number of growth measures, MA, WA, and DA. It was reasoned that if the organismic-age concept is valid, if there is inherent unity in growth factors, inherent interrelatedness, it should follow that the first component—variation among the means from individual

¹⁶ Gates, *op. cit.*

to individual—should account for a significant and substantial proportion of the total variation among the measures employed. This, as is seen in the following, was not found to be the case.¹⁷

VARIATIONS IN SCORES

<i>Grade</i>	<i>First Component</i>	<i>Second Component</i>
4	9 per cent	91 per cent
5	12	88
6	15	85

This operation was carried out separately for each of three grades. Conceivably, the use of a larger number of growth measures might have led to a different proportion of total variations ascribable to the first component.

Growth in intelligence of bright and dull children. Growth of bright and dull children presents pretty much the same characteristics as that of average children. We have already seen that bright and dull children are bright and dull at all stages of mental growth. A bright adult does not achieve that distinction by virtue of a longer period of growth. He develops faster all along. The converse is true of the dull. This is really the meaning of the IQ; it expresses rate of mental growth. A child who achieves an IQ of 120 grows mentally 1.20 of a year for each calendar year. In five years he gains a mental year, and in ten years he gains two full years, and so on. A child who achieves an IQ of 80 grows .80 of a mental year for each calendar year, and shows corresponding losses at five, ten, and so on.

It has been argued in the past that bright children grow at an accelerating rate, with respect to the average; and that dull children grow at a decelerating rate. According to this point of view the IQs of bright and dull children increase and decrease respectively as they grow older. There appears to be no evidence to support the view that the IQs of bright children increase with age. There is some evidence, though equivocal, for some loss in IQ upon the part of dull children. Perhaps the safest position to

¹⁷ Blommers *et al.*, *op. cit.*

take for the present is that the growth characteristics of bright and dull children do not differ significantly, except in rate, from those of children in general and that this difference in rate is a constant one. All three groups apparently maintain their relative rates, and reach maturity at about the same time. Some of the data from Lincoln's report on the first seven years of the Harvard Growth Study are presented in Table XIV.¹⁸ Approximately 1200 children received two or more Stanford-Binet examinations during this period. The average deviation in IQ is about 7 points, for all cases combined. The deviations at the higher IQ levels are considerably greater than at the lower levels. This is in keeping with a fact noted in Chapter VII that high IQs are less reliable than low ones.

TABLE XIV
CHANGES IN IQ AS RELATED TO IQ LEVELS

IQ Level	Boys				Girls			
	MEDIAN		MEDIAN		MEDIAN		MEDIAN	
	N	Gain	N	Loss	N	Gain	N	Loss
120 and above	151	9.69	165	9.05	88	8.33	115	9.10
110-119	146	11.21	120	7.33	155	8.59	144	6.51
90-109	404	8.08	333	6.81	408	8.00	339	7.31
80- 89	124	7.69	99	4.96	89	6.95	110	6.59
Below 80	125	7.32	64	4.61	55	6.62	70	5.54

In this table N signifies number of changes, not the number of children examined.

Thus far we have been considering mental-growth curves of groups of children. Even if individual scores fluctuated rather widely from year to year, average scores would remain rather stable if the fluctuations distributed equally on either side of the mean. On the other hand, it is of interest to know the size of the fluctuations, say in IQ, of a number of individual children tested at different times over a period of years.

¹⁸ E. A. Lincoln, "Stanford-Binet IQ Changes in the Harvard Growth Study," *Journal of Applied Psychology*, 20 (1936), 236-42.

These matters are by no means easy to settle. If for the sake of discussion we grant that intellectual growth of all individuals is featured by the regular progression shown in the composite curves, the individual curves plotted in terms of test scores would not as a matter of course show regular progression. The performance of human beings is variable. The tests are not perfectly reliable. We never have a child's *true* IQ, for example, at any one age level; we have an *obtained* IQ (see Chapter VII). With a test having a reliability coefficient of .92, which is about typical, we have a PE of slightly more than 3 IQ points. Thus it is always a question of whether deviations in test scores represent an error in measurement or a change in rate of intellectual growth.

Knowing the PE of a test, we can establish, by conventional statistical procedures, the probability that a given deviation is a function of chance, as was noted in the previous chapter. For the case in point we may expect an obtained IQ to deviate the true IQ by 9 points (3 PE) above or below—a range of 18 points—by chance about one time in 21; and to deviate 6 points, above or below, about once in 4.5 times. Thus to talk with much confidence about fluctuations in individual curves, we should have to set up limits, in terms of the known reliability of the test in question and of the IQ level in question (Chapter VII) within which we would expect deviations by chance with a given probability.

Admitting that there are unknown fluctuations in rate of intellectual growth and known fluctuations in test scores owing to chance, we are still warranted in stating that intellectual growth as measured has considerable stability. A child who, by a succession of yearly testings, is shown in his youth to be dull, average, or bright, is not likely to deviate from one of these categories so widely by the time he reaches adulthood as to deserve a ranking in another of the categories.

Jones and Conrad in the work just cited presented fluctuations in intelligence scores for each of several typical cases over a span of years as follows: lower sixth grade, lower seventh, lower ninth, higher ninth, higher eleventh, and higher twelfth. The results in

terms of average deviation in IQ for seven cases ranging from dull to bright for the six examinations are as follows: 5; 4.3; 5.6; 7.2; 3.2; 4.3; and 3.5. The scores reported by Jones and Conrad for the six examinations have been converted into approximate IQ points, by the writer, as just given. In terms of the reliabilities of intelligence tests fluctuations of this magnitude are not a great deal above what we would expect by chance.

To say that mental growth is regular and continuous as revealed by IQ scores is not to make any statement about the shape of the mental-growth curve as it has been discussed. All that is implied is that as they grow up persons tend to keep their relative positions with respect to their own age. A pupil scoring an IQ of 125, for example, at eight, nine, and ten years manifests a rate of growth of 125 per cent in respect to his age peers. This does not suggest that the MA units used in the derivation of the IQs are equal units.

Decline in Test Scores

We have fairly conclusive data on the intelligence-test performance of adults ranging all the way from early maturity to old age. Miles and Miles administered the Otis Self-administering Intelligence Test to 823 persons ranging in age from about fifteen to about ninety. The mean mental ages as obtained with 617 cases

TABLE XV

RELATIONSHIP BETWEEN MENTAL AGE AND CHRONOLOGICAL AGE

CA	N	MA	CA	N	MA
15-19	51	17.5	55-59	56	15.4
20-24	40	17.3	60-64	50	15.1
25-29	40	17.4	65-69	53	14.3
30-34	43	16.8	70-74	42	14.1
35-39	44	16.7	75-79	26	13.0
40-44	48	16.5	80-84	13	11.6
45-48	42	16.6	85-89	5	11.10
50-54	63	15.11			

in City B for the various ages arranged in class intervals of five are shown in Table XV.¹⁹

The unmistakable tendency for mental age to decline from early maturity onward is also illustrated by the correlation procedure. Miles and Miles obtained coefficients of approximately $-.50$ between chronological age and mental age. The results in relation to schooling are shown graphically in Figure 8.

The data reported above were confirmed the following year by an investigation conducted by Jones and Conrad.²⁰ They administered the Army Alpha intelligence tests to 1191 subjects between the ages of ten and sixty residing in nineteen New England villages. The villages were so selected as, in the opinion of the authors, to provide a fair sample of the rural population (of Massachusetts, Vermont, and New Hampshire).

By a special treatment of his data, which cannot be described here, Lorge has shown that some of the decline in test intelligence incident to increasing age (after maturity) is due to a decline in speed of work. However, even on the untimed test IER Intelligence Scale CAVD he obtained for his subjects ($N = 143$) a coefficient of $-.30$ between CA and test scores. The average coefficient for five group tests, with time limits imposed, for the same group is $-.45$.²¹

What is the meaning of these dramatic data? When large differences in test performance are found between individuals or groups, other associated differences are also usually found. The problem at hand is no exception. As is seen in Chapter XI, decline in learning performance in general is proportional to the decline in mental-test performance, from maturity to old age. However, there is nothing in these data to suggest that a person in his later

¹⁹ C. C. and W. R. Miles, "The Correlation of Intelligence Scores and Chronological Age from Early to Late Maturity," *American Journal of Psychology*, 44 (1932), 44-78.

²⁰ H. E. Jones and H. S. Conrad, "The Growth and Decline of Intelligence," *Genetic Psychology Monographs*, 13 (1933) No. 3.

²¹ I. Lorge, "The Influence of the Test upon the Nature of Mental Decline as a Function of Age," *Journal of Educational Psychology*, 27 (1936), 100-10.

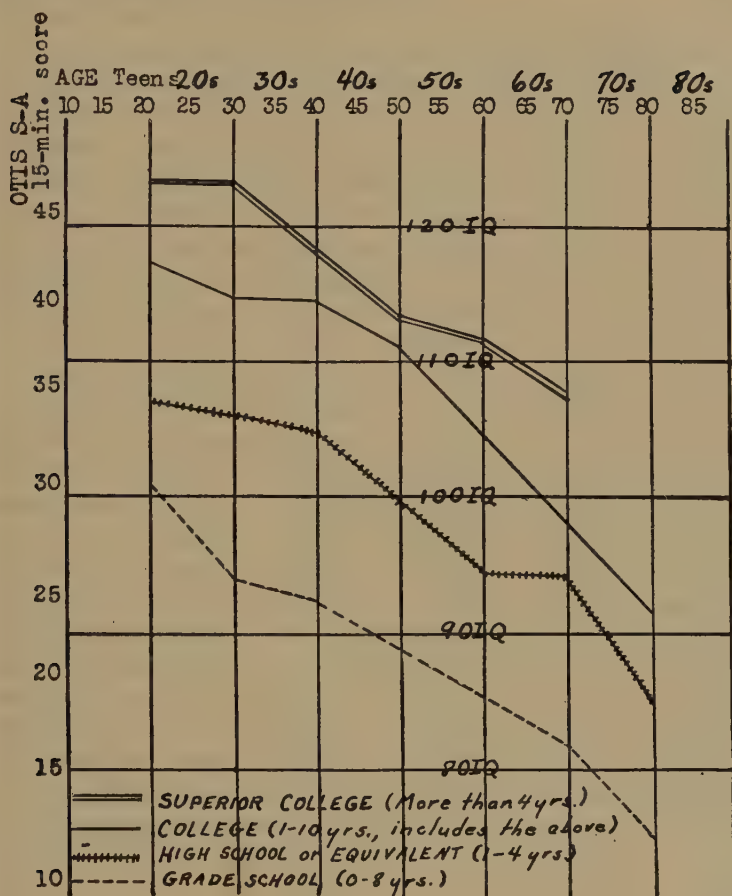


Fig. 8. Decade Distributions of Mean Intelligence Scores for Groups Representing Four Educational Levels (Data from Both Cities Combined)

years is at a disadvantage in comparison with younger persons in his own field of specialization. A judge at sixty-five may be far more discerning as to a complicated point of law than an equally bright college senior. A chemist at sixty-five may surpass an

equally bright college senior in quickness and thoroughness in understanding a treatise on chemistry. This is true because neither the judge nor the chemistry professor has nearly so much to learn about the matter at hand. Much is known to him already. Relatively little is novel to him. The college senior would be expected to outdistance both of them in a learning project that was equally novel to all three. A part of what we understand from the printed page comes through our eyes, but another part, perhaps the larger part, comes out of our heads, to paraphrase William James. In the law the judge, or in chemistry the professor, has the better head.

There may be also some other general factors that are common to taking intelligence tests and participating in learning experiments which put older people at a disadvantage. For example, the older a person becomes, the farther away he is from school situations, where he was in the habit of following instructions, executing tasks quickly, and otherwise doing what was expected of him. But the fact that older persons compare with younger ones much less favorably on novel learning tasks than on relatively familiar ones suggests that remoteness from the work habits of the schoolroom is no more than a contributing factor. While the decline may be quite genuine, in a restricted sense, there are so many compensating factors, especially those associated with experience and habits of thought and work, that older people in their daily walks of life seem actually to be at an advantage.

Distribution of IQs

IQs derived from MA scores, weighted point scores, and the like usually distribute normally for any given age level. The percentage of children exhibiting a given degree of brightness equals approximately the percentage exhibiting a complementary degree of dullness; and frequency distribution curves show the bell-shaped characteristics of the normal curve. Thus the number of eight-year-old children earning an MA score of 9 equals the number earning an MA score of 7, and so on. This will be con-

siderably higher than the number of eight-year-olds earning MAs of 6 and 10, respectively. For any age group having an SD of 16 IQ points, 68 per cent should achieve IQs between 84 and 116, 16 per cent below 84, and 16 per cent above 116. For the eight-year-old group, 16 per cent should achieve MAs of 9.28 or above, and 16 per cent, MAs of 6.72 or below. The percentage achieving MAs one year or more above mean age and one or more years below will, of course, vary with mean age, even if SD is constant from age group to age group. However, if SD is constant for all age groups, the percentage achieving IQs above or below any given amounts will remain constant.

As was noted in Chapter VII, the SDs of Stanford-Binet IQs and Wechsler IQs are not perfectly constant for the various age levels—Wechsler IQs being more nearly so. On the other hand, variability is not so great, perhaps, as to prevent our assuming constant values of 16 for the former and 15 for the latter, so long as we are aware that they are subject to some departures in known amounts. Figure 9 is a hypothetical distribution of MAs and IQs of seven-year-old children, assuming an SD of 16.2 (the exact SD for seven-year-old standardization cases, on Form L).²² MAs, IQs, and corresponding percentages are shown for various SD points along the base line. In practice it is customary to speak of the points marking off the bottom and top of the middle 50 per cent as the “normal range.” With this hypothetical population the middle 50 per cent falls between 89 and 111. If the determination is based upon an SD of 15, as in the Wechsler tests, the IQ range for the middle 50 per cent is 90 to 110. IQs are interpreted in the light of the percentage of persons achieving higher, or lower, values. For example, 130, Wechsler, and 132, Stanford-Binet, are equally high. How high? They are exceeded by only 2.3 per cent of the general population. They are considerably above the average of college graduates. They are regarded as quite adequate for most jobs in the learned professions. They are still not good enough for many kinds of high-level intellectual

²² From J. B. Stroud, in *Psychology in Use* (New York: American Book Co., 1941), p. 288. Reproduced by courtesy of the publishers.

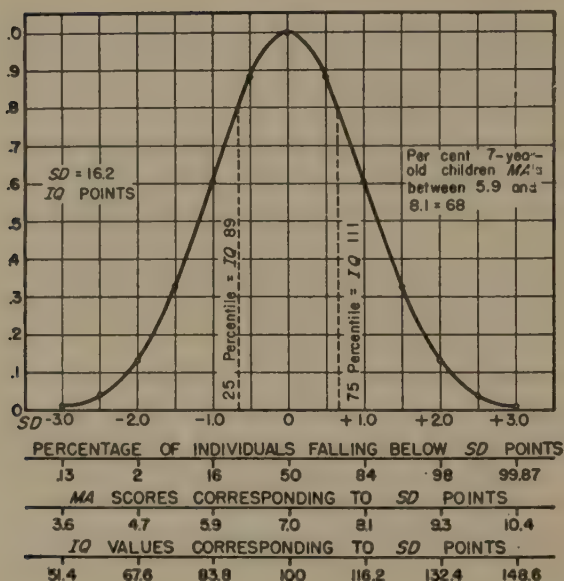


Fig. 9. Distribution of intelligence test score of 7-year-old children.
Distribution of MAs and IQs by percentage

creativity. How rare is 160, Wechsler, or 164, Stanford-Binet? This is $\frac{60}{15}$ or $\frac{64}{16} = 4$; 160 is 4 SDs above the mean in the first case, just as 164 is 4 SDs above the mean (100) in the second place. How frequently does something occur at 4 SD; that is, how frequently would one encounter a pupil an IQ 4 SDs from the mean? The answer is approximately once in 10,000 times; one would encounter a pupil achieving an IQ 5 SDs from the mean 4 times in a million.

Minus 5 SDs takes us to the idiot level. Such children "cannot learn to talk," (Binet) or "cannot guard themselves against the common dangers of life" (the British Royal Society). Are there only 4 such children per million? This is the theoretical probability. The number probably exceeds the theoretical prediction.

There are diseases, accidents, injuries, and anomalies of various kinds that lead to idiocy. Needless to say, there are no diseases, accidents, or injuries that are productive of extreme brilliance. Three SDs below the mean brings us down almost to an IQ of 50. This is about the lower limit of educability, by current public-school practice. The theoretical expectation of an event's occurring at 3 SD is about .13 per cent. The prediction is that we should find 1.3 children per thousand at the IQ level of 50 and below (actually at the Stanford-Binet IQ level of 52 and below). Again, cerebral palsy, encephalitis, accidents, and so on may increase this figure of .13 per cent slightly. If it is three or four times greater, it is still not large.

The Nature-Nurture Issue

I propose to show in this book that a man's natural abilities are derived by inheritance, under exactly the same limitations as are the form and physical features of the whole organic world. Consequently, as it is easy, notwithstanding those limitations, to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly gifted race of men by judicious marriages during several consecutive generations.²³

The issue thus raised by Galton is as vital today as it was in 1869. There were no intelligence tests then, a fact that made the investigation of any question pertaining to intelligence difficult. We have had intelligence tests for fifty years. But fifty years of testing and research have brought us little closer to a solution of the problem. A great many data bearing upon the problem have been collected, data that are interesting and valuable in themselves, but which are equivocal insofar as the nature-nurture issue is concerned.

Let us start with an analogy of physical growth, where it is agreed that there are important hereditary factors. It is also

²³ F. Galton, *Hereditary Genius: An Inquiry into Its Laws and Consequences* (New York: The Macmillan Company, 1914), p. 1.

agreed that there are important environmental factors. Twelve-year-old children are about 5 inches taller than twelve-year-old children were fifty or sixty years ago. This change may be due, or in part due, to better diet, but we could scarcely believe that hereditary factors are responsible for such a dramatic and sudden change. But among families affording more or less comparable diets there are large differences in the heights of the children. To grow in a normal and healthy way children require an adequate diet. It would be fairly easy in extreme cases to demonstrate the effects of a poor diet. It might be difficult to demonstrate a beneficial effect of a diet considerably above adequate requirements. Children require many food elements, but the body can assimilate only about so much of each of these elements.

Also we know that a certain amount of stimulation, instruction, and learning is essential for mental development, at least development in a functional sense. We could not begin to teach a six-year-old child to read unless he had already learned a great deal. Moreover, we could not assess his intelligence. It makes no sense to say he is intelligent despite our inability to detect it, no more than to say a child who is stunted in growth is of normal size only he does not show it. We probably have no children who are totally deprived of opportunities to learn; but we do have many who have had limited opportunities. Among these are the deaf-born, and other children who have been subjected to severe cultural isolation, such as "Canal Boat"²⁴ and "Hollow Folk"²⁵ children. Again, it makes no sense to say that such children are as intelligent as others, that they simply have no good way of showing it. It is difficult to see how we could keep an intelligent child from revealing his intelligence, if we knew what to look for. The limitations of culturally isolated children do not end with poor performances on intelligence tests.

In contending that adequate cultural and educational advan-

²⁴ H. Gordon, "Mental and Scholastic Tests among Retarded Children," (London: Board of Education Pamphlet, No. 44, 1923).

²⁵ M. Sherman and T. R. Henry, *Hollow Folk* (New York: Thomas Y. Crowell Co., 1933).

tages are necessary for a child to develop his full intellectual potential, we need not go to the opposite extreme of assuming that we can make a superior child out of a child of average potential by the expediency of a highly superior intellectual environment. In any event, there is no doubt that children of every measurable degree of brightness can be found at all normal cultural levels in Western society. This fact points to a strong influence of heredity. But it is also known that brightness and dullness are found with much greater frequency at some cultural levels than at others. Thus there are two facts to account for: (1) differences within cultural and/or social-class levels and (2) differences between these levels. At least there is no pressing reason why these differences may not be attributed to both hereditary and environmental factors, especially differences between cultural and/or social-class levels.

Several sorts of data are associated with the discussion of the nature-nurture issue. Generally, the interpretation of the data is subject to equivocation. The phenomena themselves, most of them at least, are fairly well agreed upon. They represent known facts associated with intelligence-test performance and are worth reporting for their own sake.

Family resemblances. (1) *Galton's investigation.* Galton's celebrated study of 977 eminent men was perhaps the first systematic attempt to apply to the subject of mental development the acknowledged fact that hereditary traits tend to run in families.²⁶ Upon compiling the list of eminent men, he set about to determine the number of relatives they had of like eminence and to contrast this number with the number normally expected from any 977 men selected at random. He found 332 close and 203 remote relatives of a degree of eminence comparable to that of the original list; that is, who ranked as 1 in 4000 men. On the other hand, he reckoned that the normal expectancy for a random sampling of 977 men was one close relative of this degree of eminence, and three remote relatives.

(2) *Degenerate families.* The pioneer study of degenerate

²⁶ Galton, *op. cit.*, p. 1.

families was made by Dugdale, a study that embraced seven generations of the Jukes family.²⁷ The investigation was brought up to date in 1915 by Estabrook.²⁸ Data were compiled on 540 blood relatives and 169 persons related by marriage. It is estimated that the total cost of this family to the State of New York in pauperism, crime, vice, and disease was \$1,500,000 within the period of seventy-five years.

The best known of the investigations is Goddard's of the Kallikak family.²⁹ The history of this family dates from Revolutionary War days. At the time of the investigation there were 480 known descendants. The findings are summarized in Goddard's words as follows:

The surprise and horror of it all was that no matter where we traced them, whether in prosperous rural districts, in the city slums to which they had drifted, or in the remote mountain regions, or whether it was a question of the second or sixth generation, an appalling amount of defectiveness was everywhere found.³⁰

(3) *Sibling resemblances in test intelligence.* The figure that is commonly taken as representative of the correlation between the intelligence-test scores of sibling pairs is .50. Conrad and Jones report an average coefficient of .49 between sibling scores on both Stanford-Binet and Army Alpha tests.³¹

²⁷ R. L. Dugdale, *The Jukes: A Study of Crime, Pauperism, Disease, and Heredity* (New York: Putnam, 1910). First edition published in 1877.

²⁸ A. H. Estabrook, *The Jukes in 1915* (New York: Carnegie Institute, 1916).

²⁹ H. H. Goddard, *The Kallikak Family* (New York: The Macmillan Company, 1912).

³⁰ *Ibid.*, p. 16.

³¹ H. S. Conrad and H. E. Jones, "A Second Study of Familial Resemblance in Intelligence: Environmental and Genetic Implications of Parent-Child and Sibling Correlations in the Total Sample," in *Intelligence: Its Nature and Nurture*, Thirty-Ninth Yearbook, National Society for the Study of Education (Bloomington, Ill.: Public School Publishing Co., 1940), Part II, pp. 97-141. See also G. H. Hildreth, "The Resemblance of Siblings in Intelligence and Achievement," *Teachers College, Columbia University, Contributions to Education*, No. 186, 1925; E. S. Dexter, "On Family Resemblances beyond the First Degree of Relation," *School and Society*, 19 (1924), 501-02.

(4) *Parent-Child resemblances.* An investigation by Jones is representative of the obtained relationship between the test intelligence of parents on the one hand and that of their children on the other.³² He administered the Army Alpha to a group of parents ($N = 210$) and to children over 14, and the Stanford-Binet to children from 3 to 14 (total $N = 317$). Some of the correlations obtained are as follows:

	Son	Daughter	Son and Daughter
Father	.52	.51	.51
Mother	.54	.56	.55

Subsequently, Conrad and Jones obtained a coefficient of .49 between Stanford-Binet scores of parents and offspring and a coefficient of like magnitude between Army Alpha scores of parents and offspring.³³

(5) *Twin resemblances.* There are reports of a number of investigations of the relationship between the mental abilities of twins, some of which antedate the advent of intelligence tests.

TABLE XVI

RESEMBLANCES BETWEEN IDENTICAL AND FRATERNAL TWINS

<i>Measures</i>	<i>Identical</i> (50 pairs)	<i>Fraternal</i> (52 pairs)
Finger ridges	.97	.46
Standing height	.93	.65
Binet IQ	.88	.63
Otis IQ	.92	.62
Word meaning	.86	.56
Nature study	.77	.55
History and literature	.82	.67
Spelling	.87	.73

³² H. E. Jones, "A First Study of Parent-Child Resemblance in Intelligence," *Nature and Nurture: Their Influence upon Intelligence*, Twenty-Seventh Yearbook, National Society for the Study of Education (Bloomington, Ill.: Public School Publishing Co., 1928), Part I, pp. 61-72.

³³ *Op. cit.* See also H. M. Richardson, "Studies of Mental Resemblances between Husbands and Wives and between Friends," *Psychological Bulletin*, 36 (1939), 104-20.

The results of an investigation conducted by Holzinger, Freeman, Newman, and Mitchell are reported in part in Table XVI.³⁴

A fair appraisal of the published correlations pertaining to the correspondence between the test intelligence of twin pairs is contained in the following coefficients:

INTELLIGENCE OF TWINS

<i>Comparison</i>	<i>Correlation</i>
Fraternal twins	.60 to .65
All twins	.70 to .75
Identical twins	.85 to .90

Foster-home placement. Of the practicable methods of investigating the nature-nurture issue, foster-home placement is by far the most promising.³⁵ Really the only serious drawback to this method is the fact that placement agencies like to place children for adoption only in good foster homes. The fact that we frequently know little about the true parents of adoptive children is not too serious. If we could place 100 infants, randomly selected, in each of Warner's social classes, the 100 foster families in each social class being randomly selected, we could estimate pretty accurately the effects of varying cultural differences as found today in the United States. If we had an adequate sample of infants ready for adoption whose true parents were drawn from the lower social class, it would not be too critical if the infants were adopted only by upper-class and middle-class foster parents. We could ascertain whether the subsequent test performance of the foster children resembled chiefly that of their

³⁴ K. Holzinger, "The Relative Effect of Nature-Nurture Influence on Twin Differences," *Journal of Educational Psychology*, 20 (1929), 241-48.

³⁵ Of course the matter could be settled once and for all and within five to ten years by entering into contracts with say 500 selected parents to bring forth one child each and then rearing these children under planned conditions. It is as simple as that. None of the children need be reared under worse conditions than those under which millions are now reared for no good reason at all—except the dereliction of parents and of society. Rearing under bad conditions of course would be shocking to human sensibilities, if not positively revolting.

true parents and their social-class level or that of the social-class level of their foster parents.

A procedure somewhat like that just described was employed by Skeels and Skodak in their investigation of the effect of foster-home placement. About 150 infants (under six months of age) of illegitimate parentage were placed in economically favored homes. The occupations of 80 per cent of the true fathers were known. Of these, 81 per cent were employed in the lowest three occupational groups (on a 7-group scale). Intelligence tests were administered to about one-half of the true mothers. They were found to test low. The average school-grade attainment of the true mothers was 9.7; that of the alleged true fathers, 10.5. Obviously, the results would be more nearly definitive had complete data been obtainable on all of the true fathers and mothers. But it is reasonable to suppose that the true parents as a group were below average in test intelligence and socioeconomic status, and that had the children been reared by their true parents they would have turned out to have IQs of a magnitude typical of such parents in the general population; that is, below average.

Periodic mental examinations were made from time to time of these adopted children. On the whole, their level of performance resembled that expected of own children of parents of favored socioeconomic status.³⁶ To say the least, these results are striking. If repeated and substantiated, they will serve as an argument in favor of a greater environmental influence than most authorities are at present willing to concede.

Changes as related to special training. Schmidt has reported quite a comprehensive investigation of changes in IQ associated

³⁶ H. M. Skeels, "Mental Development of Children in Foster Homes," *Journal of Consulting Psychology*, 2 (1938), 33-43 and "Some Iowa Studies of the Mental Growth of Children in Relation to Differentials of the Environment: A Summary," in *Intelligence: Its Nature and Nurture*, loc. cit., Part II, pp. 281-308; M. Skodak, "The Mental Development of Adopted Children Whose True Mothers Are Feeble-minded," *Child Development*, 9 (1938), 303-08 and "Children in Foster Homes: A Study of Mental Development," in *University of Iowa Studies: Studies in Child Welfare*, 16 (1939), No. 1.

with an extensive period of training organized for "feeble-minded adolescents."³⁷ There were 322 pupils in the various groups, ranging in age from twelve to fourteen. The objectives of the educational program are stated in part as follows: "the development for feeble-minded adolescents of an educational program which would relieve emotional tensions, provide for social interaction, and develop self-confidence and a feeling of personal worth." At the end of the three-year school period the students showed gains in Stanford-Binet IQs of about 20 points. Even larger gains were registered in emotional adjustment and social development. The gains in IQ reported are much larger than most psychologists were or are prepared to accept. The investigation has provoked considerable controversy. This will not be gone into here, at least not in a technical way. It does not seem unreasonable that there should have been at least substantial gains in performance on intelligence tests if the total educational program was genuinely effective.

These pupils were twelve to fourteen years of age at the beginning of the special school period. No group had obtained a reading level as high as the second grade. Their school histories were histories of failure. In addition, they had probably been largely ignored by their fellows. If we were picking a sequence of experiences that would lead to a loss of self-confidence and a loss in feelings of self-worth, we could scarcely do better than duplicate the conditions under which severely retarded children typically work in our schools. When conditions are radically changed, when such children are accepted by their teachers and peers, when in the place of abject failure we find success and hope, it should not be surprising that they perform better in test situations and in learning situations. It is possible that such pupils had the potentiality at the beginning of the special three-year school period to perform at higher levels on the Stanford-Binet test than they did—had their potential not been dissipated by

³⁷ B. G. Schmidt, "Changes in Personal, Social, and Intellectual Behavior of Children Originally Classified as Feeble-minded," *Psychological Monographs*, 60 (1946), No. 5, p. 144.

failure, loss of confidence and self-worth. A good intelligence test ought to be sensitive to this sort of thing.

Although Schmidt's gains may be somewhat larger than expected, it is not necessary to assume any change in "sheer intelligence" if that expression means anything. We do not ever measure "sheer intelligence." We take samples of behavior. In addition to "sheer intelligence," behavior is influenced by such factors as experience, motivation, and expectation of success.

The Social Status Issue

Two facts regarding this important issue are rather well agreed upon; namely, that there are substantial differences in intelligence-test performance among persons of different social-class status, and that these differences in scores are educationally significant. As stated in Chapter II, IQs of lower-social-class pupils distribute around a mean of about 92, .5 SD below the general mean, and those of upper-social-class pupils distribute around a mean of about 116 (Stanford-Binet IQs), 1 SD above the general mean. Another way of stating this fact is that the mean IQ of lower-class pupils corresponds to the 31st percentile and that of upper-class pupils to the 84th percentile of the general population.

The first question that generally arises when these facts are presented is: Are the intelligence tests equally fair to pupils of all social classes? This question has certainly not been answered to the satisfaction of everyone. There are, however, some highly relevant statements that can be made about it. Perhaps the most important is that the differences among children of the various social classes are not confined to test scores. If all the difficulty lay in the intelligence tests, as is sometimes implied by the use of such words as "unfair" or "cultural bias," then in all other spheres of intellectual behavior there should be no social-class differences—for example, in schoolwork. At first glance this looks rather convincing, but here it is difficult to avoid circularity of argument.

It has been affirmed that our schools are (social) class-structured. Upper-class and middle-class youth certainly stand as more interested in the school curriculum, to be better prepared in terms of home training to cope with it, and to be under greater pressure to learn. As was noted in Chapter II, our educational program is in need of a more realistic adjustment to the needs and the interests of lower-class youth. But school is to a large extent an intellectual institution. At the elementary-school level the needs should be fairly common to all social classes. All classes use pretty much the same reading, spelling, and arithmetic skills. At least they need some of the same skills. But everywhere we find large social-class differences in achievement.

It is just possible that social-class differences on intelligence tests are unavoidable in a class-structured society. This statement is not necessarily intended to imply that there are innate differences in mental ability among social classes. Moreover, it may well be that test designers have been careless in the use of test items that needlessly accentuate social-class differences. Undoubtedly the rather lively discussion of this issue within the last five years or so will have a salutary and lasting effect. These admissions notwithstanding, it is quite possible that the differences in experience, motivation, and even habits of work associated with social-class differences would affect not only performance on intelligence tests but also the broader aspects of mental development. If this is true and if so, to the extent that it is true, we are hardly justified in attributing the differences to cultural bias in the tests. It is possible that the tests reveal society's cultural "bias" that is already implanted in the mental make-up of the children when they come to the examiner's office. Unless growth of intelligence is entirely a hereditary matter, this would appear to be inevitable. There is also the possibility of a biological "bias." In fact it may well be that there is "bias" in the tests, in the social order, and in the respective biological histories.

An important work recently published by Eells and his associates delineates various social-class phenomena that may affect

intelligence-test scores.³⁸ They may also be viewed as social-class phenomena affecting achievement in school and mental development in general, if one wishes to accept this point of view. In any event they seem highly important. Havighurst discusses cultural differences in *the home*, in *neighborhood and community life*, in *school experiences*, and in *motivation for test performance*.³⁹ Children in upper-class and middle-class homes have better opportunities to acquire a knowledge of many things not commonly found in lower-class homes, such as "fireplace, chandelier, wallpaper, salad fork, and dining room." They are more likely to gain educational experiences through trips and vacations with their families, to attend summer camps, to visit places of cultural interest. Their parents, being sensitive to the educational value of such experiences, tend to stimulate interest, supply information, provide interesting books and magazines correlated with these visits. Thus they learn geography, learn about other sections of the country, about agriculture, animals, plant life, and about people of other cultures. There are more newspapers, magazines, and children's books in the home. Children in upper-class and middle-class homes are accustomed to better language. Their parents use much larger vocabularies, and are more discriminating in their use. They are more likely to be careful to teach good language usage and to encourage the development of large and useful vocabularies in their children. They read more books to their young children and tell them more stories. By comparison, the lower-class child has limited educational opportunities in the home. He does, of course, have better acquaintance with some things than more favored children, but these are strictly limited and do not provide the rich background for learning in school that is provided by the home life of favored children.

Children of different social classes live in different kinds of neighborhoods and have different kinds of community experi-

³⁸ K. Eells, A. Davis, R. J. Havighurst, V. E. Herrick, and R. Tyler, *Intelligence and Cultural Differences* (Chicago: University of Chicago Press, 1951).

³⁹ *Ibid*, pp. 18-21.

ence. The typical child learns a great deal on the playground and from informal gatherings of children—through the normal processes of social interaction. What children “teach” one another is to a large extent an extension and a reinforcement of home and community standards. The games they play, and the clubs and organizations to which they belong, are to a large extent a function of the community in which they live. Many of these connections have important educational value. Test items that presuppose familiarity with “art and the history of art, music (especially classical music), drama, anthropology, archeology and natural history, are likely to favor” upper-class and middle-class children. Culture and educational experience are to a considerable extent community variables; and the community a child lives in is a function of the social class of his family, just as are the type of house he lives in and the nature of his home life.

As Havighurst points out, the school is more or less an extension of the middle-class home. The school tends to reward the pupil for much the same things as the middle-class home does. The expectations in the way of social behavior of the child, promptness and efficiency in doing his work, and attitudes toward his teachers, are examples. The middle-class or upper-class child is on familiar ground in school. School expectations tend to be continually reinforced in the home. The home takes a more active interest in his school progress, rewards him for success, and becomes quite concerned about failure or dereliction. Moreover, in our cities schools, especially elementary schools, belong to communities. Children living in desirable communities can attend better schools, not only better-equipped schools or schools affording better teachers, but schools that can demand and secure a higher level of performance. In such schools children can be required to do more reading and they probably will do a great deal more reading on their own initiative than will the children in poorer communities. The curriculum can actually be more academic, and socially favored children stand to find richer educational experiences in general. We would expect these differences in school experience to put lower-class children at a disad-

vantage on conventional intelligence tests. Does the disadvantage end with the test? Are they also at a disadvantage in mental growth—which the test purports to measure? It has already been suggested that there may be some of both.

Finally, Havighurst suggests that differences between lower-class children on the one hand, and upper-class and middle-class on the other, in motivation, expectation, reward and punishment, and in social pressures, extend to the examining room as well as to the classroom. Education, school, and tests are important to upper-class and middle-class children. They are important because attitudes toward them have been taught by upper-class and middle-class parents. The child from these two classes is not likely to take testing lightly. He is expected to co-operate and do his best, and he is in the habit of doing so. By comparison, education, school, and tests tend to have less force among lower-class children. The homes have not generally served to build up a high level of anxiety about school and associated activities. The parents themselves have had no great amount of formal schooling, as compared with parents of socially favored children. Their civic and occupational expectations for their children do not presuppose a great amount of education.

There have been two or three attempts to build “culture-free” or “culture-fair” intelligence tests. Success would be welcome for various reasons. It remains to be seen what differences, if any, these tests would reveal among social classes. It is a question whether or not *valid* intelligence tests can be built that will not also show substantial social-class differences. This is one of the questions we would expect such a test to answer. In the light of this discussion we might expect to find somewhat smaller but still substantial differences.

Effect of Schooling

It is a well-known fact that intelligence-test performance of adults is related to the number of years they went to school. It is also a known fact that college seniors score higher than college

freshmen, and that high-school seniors likewise exceed high-school freshmen. In the first large-scale intelligence-testing program ever undertaken, on the Army draft in World War I, the results were analyzed to determine the relationship between the intelligence scores (Army Alpha) and the amount of schooling. A correlation coefficient of .74 was obtained between the Alpha scores and the highest grade attained in school.⁴⁰ In World War II a correlation coefficient of .73 was obtained between AGCT (Army General Classification Test) scores and the highest grade completed in school, for a sample of drafted men.⁴¹

These facts do not tell us that intelligence scores improve with schooling, since when the problem is put in this way, we cannot separate years of schooling from various selective factors. The persons who graduate from college far exceed those of the same age who dropped out of school at the end of the ninth grade. But they also exceeded them when both were in the ninth grade.

Some students who terminate their schooling at various points before graduation from high school, or before graduation from college, are just as able intellectually at the time of their separation from school as some who are destined to persist until graduation. It is these groups that should be compared. But this is a difficult undertaking. In any large school system there will be a number of students who drop out of school at the end of the ninth grade, or at the end of the tenth, eleventh, twelfth grade. Various kinds of intelligence measures are usually available. A file of such students, of those who can be matched in intelligence scores with others who remain in school, could be kept. At a later time, say at the end of ten years, these students (both groups), now adults, could be re-examined. Naturally, they would be difficult to find. There might also be some difficulty in inducing them to submit to the examinations. Ordinarily a research worker does not want to wait so long for results. It would

⁴⁰ R. M. Yerkes, "Psychological Examining in the United States Army," *Memoirs National Academy of Science*, 15 (1921).

⁴¹ *Psychological Bulletin*, 42 (1945), 760-68.

probably be just about as satisfactory to work backward from a given point of time when adequate records are available.

Lorge reports a follow-up of a representative sample of 863 boys in New York City. The boys were tested when they were in the eighth grade during the school year 1921-22.⁴² Twenty years later a representative sample of 131 out of the original group was re-examined. Lorge was able to determine the relationship between test scores earned at this time and the highest grade completed in school. He did this separately for groups whose original scores were more or less comparable. The subgroups were necessarily small. For one subgroup whose original test scores fell between 79 and 88, he obtained the following Otis raw scores (1941) per years of schooling.

	SUBGROUP SCORES						
N	5	8	8	9	4	6	5
Highest grade completed	8	9	10	11-12	13-14	15-16	17 and above
Otis scores	26.4	31.1	28.5	31.0	34.7	39.5	46.0

In combining Lorge's subgroups, Anastasi and Foley were able to demonstrate that a difference of seven or eight years of schooling was associated with a difference of from 10.7 to 16.5 score points.⁴³ These authors observe that the variability in 1941 Otis scores attributable to differences in schooling is approximately as great as that associated with the original psychological scores. They also suggest that because of the size of the original score intervals used, the effects of schooling may be exaggerated a little.

Some of the effects in an investigation of the kind we have just been considering may be attributable to the direct effects of schooling. Others may at best be indirect effects. A man's occupation, his associates at work and in his leisure time, his family connections, are all associated with the extent of his schooling. In

⁴² I. Lorge, "Schooling Makes a Difference," *Teachers College Record*, 46 (1945), 483-92.

⁴³ A. Anastasi and J. P. Foley, Jr., *Differential Psychology* (New York: Macmillan Company, 1949), p. 237.

other words, some of the differences showing up in favor of extensive schooling can be associated with the kind of life the individual has led since leaving school. Some occupations make greater demands upon the intellect, so do some friends and associates, all of which may exert greater pressure for reading and study in after-school years. These things are all associated with the amount of schooling one has had. They should also make a difference in intelligence-test performance. Apropos is the fact presented earlier in this chapter that the test scores of well-educated men and women do not decline with advancing age to so great an extent as those of persons whose educational attainments are more modest.

Somewhat in keeping with Lorge's data are facts brought to light by comparison of draftees in World War I and World War II on the Army Alpha group tests.⁴⁴ The median scores obtained on representative samples are 62 and 104, respectively. The score corresponding to the 50th percentile of World War II soldiers equals the 83rd percentile of World War I soldiers. Probably more than a single factor contributed to this striking difference. One is the fact that most draftees in the last war were accustomed to taking tests of the kind used. No one in the first group had ever seen such a test before, although a few may have taken objective achievement tests. There were also differences in education. In World War II the average draftee had completed the tenth grade, that of World War I, the eighth grade.

Some data recently gathered by Sligo suggest that today's high-school youth of a given grade attainment is a better intellectual specimen (at least a better scorer) than his counterpart of twenty years ago. By good fortune Sligo came across ACE Psychological Examination scores (1933 edition) administered in 1934 to the high-school populations in 50 school systems. He re-administered the 1933 edition of this test in these same high schools in 1954. His results for the ninth grade, which are representative, are as follows for the 25th, 50th, and 75th percentiles:

⁴⁴ R. D. Tuddenham, "Soldier Intelligence in World Wars I and II," *American Psychologist*, 3 (1948), 54-56.

HIGH SCHOOL SCORES

<i>Percentile Rank</i>	<i>1934 Score</i>	<i>1954 Score</i>	<i>1934 Percentile Rank of 1954 Score</i>
75	111	129	87
50	80	100	66
25	59	70	39

It should be noted that the tests in 1934 were administered in January, while the 1954 testing was done in May. This difference in time of year may account for some of the differences in the scores.⁴⁵ The 1954 students did not achieve higher scores than the 1934 students on various achievement tests.

Some Educational Applications

The applications of intelligence tests in school situations are as varied as the school's functions. In one way or another these may center around two focal points: (1) the pupils' success in and adjustment to school life and (2) pupil guidance, with respect to choosing, and preparing for, a career.

A survey embracing 321 high schools in Minnesota showed 90 per cent of the sample using some kind of scholastic-aptitude tests. Separate treatment of small and large schools gave percentages of 85 and 96, respectively.⁴⁶ Perhaps we may assume that intelligence tests are administered at some point in high-school training and in elementary-school training in the vast majority of American schools. Undoubtedly the spread of guidance services within recent years has increased the use of such tests.

When intelligence tests first came upon the school scene generally, in the early 1920s, they were hailed as a convenient and reliable means of sectioning pupils in classes according to abilities, and even as a method of assigning pupils to grades—holding

⁴⁵ J. Sligo, "A Comparison of Achievement in Selected High School Subjects in 1954 with Achievement in These Subjects in 1934," Doctor's Dissertation, State University of Iowa, 1955.

⁴⁶ C. G. Wrenn and W. E. Dugan, *Guidance Procedures in High School* (Minneapolis: University of Minnesota Press, 1950).

certain pupils back for one or more grades and accelerating others correspondingly. The use of intelligence tests for these purposes soon ran afoul of changing educational philosophies. Many educational leaders began to frown upon ability grouping; and acceleration in the form of extra promotions came to be looked upon as bad practice. Currently, one of the author's graduate students is investigating the age-grade status of elementary schools in Iowa.⁴⁷ Out of a 15 per cent random sample of the state's schools he has not found (as of 1955) a single pupil who in the first six years of schooling has received an extra promotion. As is suggested in the following chapter, with the awaking interest now shown in the education of the gifted we may see some revival of acceleration as one method of handling the gifted.

Programs of special education that have everywhere come into being within the last decade or so have led to renewed interest in the education of the mentally retarded and the slow learner. All of this has placed enlarged demands upon intelligence testing and trained psychological examiners. In addition to group intelligence tests, which are administered at some point in the elementary grades in the majority of schools, there is and has been for many years a demand for individual psychological examinations. Classroom teachers are rarely qualified to conduct such examinations; such work demands the services of school psychologists or other specially trained persons. In our better elementary schools almost every pupil in need of their school's special services—remedial reading or other remedial or tutorial services, or psychological, psychiatric, counseling, or social services—receives one or more psychological examinations. For example, until a poor reader has received such an examination authorities do not really know whether or not he presents a problem of reading retardation.

In a good mental-hygiene program we think it is desirable for pupils to achieve well in terms of their respective aptitudes. It is not a good situation when pupils come short of this, nor is it a

⁴⁷ R. E. Larson, "Age-Grade Status of Iowa Elementary School Pupils," Doctor's Dissertation, State University of Iowa.

good thing for pupils to develop too much anxiety about their schoolwork or to try to achieve at a level much higher than their aptitudes warrant. In our attempts to take care of individual differences, which has been a watchword in education for years, we certainly require the best measures of the individual capacities of our pupils that are available. For most purposes, group intelligence tests are adequate for the normal run of pupils, at least above the primary grades.

The intelligence test is one more contribution to the equipment the teacher needs in order to operate at a high professional level. The intelligence-test score, and in cases presenting special problems, scores on two or more tests, represent one of the important bits of information the professionally minded teacher keeps in individual pupil record folders. This information goes along with the pupil as he progresses from grade to grade. No doubt no good use is made of obtained intelligence scores in many schools, by the teacher or by anyone else. To withhold such information from teachers, which may indeed be desirable in some instances, is to imply that teachers are not professionally competent to make use of it.

In the case of given pupils, the classroom teacher should be free to disagree with the evaluation suggested by the intelligence-test score. She may feel upon the basis of experience that the score is too high or too low. Sometimes she may wish to have the score checked by another examination. One encounters the criticism that if teachers know the test scores of their pupils there may be a temptation to give up easily in the case of the dull pupil, or to upgrade the accomplishments of the capable one. If this is true, it is tantamount to the admission that the teachers are not capable of operating at a high professional level. If teachers are imbued, as probably most of them are, with the idea of effecting the educational growth of all pupils in keeping with their several abilities, this should not pose a serious problem. Moreover, there is no way to keep teachers from forming judgments about the mentality of their pupils. Upon these judgments they are bound to act in one way or another.

Intelligence tests in guidance programs. Today there are about 6,500,000 students in public and private high schools in this country.⁴⁸ These range in ability all the way from feeble-mindedness to an order of genius suggested by an IQ of 200. England, with a total population no greater than our 1955 high-school population, produced Milton, Bacon, and Shakespeare. Also represented in our school programs is every grade of interest, vocational aspiration, social class; and every grade of aimlessness. The vast majority of the pupils need help in the selection of vocations, at least information about vocations, and advice about courses of study appropriate to their aims and abilities. Obviously, there are many things we need to know about these pupils. One thing we need to know about each one of them is his aptitude for learning. There are different ways of ascertaining this. The cumulative record of the pupil should show his past performance as well as his former teachers' estimates of him. The intelligence score represents but one source of information. But it is a highly important one; it is the one bit of standard information, expressed in standard language, that we have.

If there is to be any organized and planned guidance, the worker will certainly need the best and most dependable knowledge available on the aptitudes of the pupils he is dealing with. This is all the more important today in the light of the search for talent that is everywhere going on—in government, business, and industry, in science, in the humanities. It is also extremely important today because our schools have assumed a greater degree of responsibility for the education and guidance of the handicapped than they formerly did.

A very recent investigation of Minnesota high-school youth by Berdie presents an excellent cross section of the high-school population.⁴⁹ From this account can be gleaned a good impression

⁴⁸ A. L. Jones and L. M. Miller, "The National Picture of Pupil Personnel and Guidance Services," *Bulletin of National Association of Secondary-School Principals*, 38 (1954), No. 200.

⁴⁹ R. F. Berdie, *After High School—What?* (Minneapolis: University of Minnesota Press, 1954).

of the kind of information we need in order to do a professional job.

Berdie reports that in 1950, 35 per cent of Minnesota high-school graduates enrolled in college. This compares with a figure of 23 per cent in the same state in 1939, and with a figure of 30 per cent for Iowa high-school graduates in 1946.⁵⁰ These differences are probably in keeping with the trends of the times. The figures do not, of course, represent the total percentage of youth going to college, since a large number do not graduate from high school; Berdie estimates that less than 50 per cent do graduate. It has been calculated that 35 per cent of all youth should go to college, at least for a year or two. This is about the percentage scoring Stanford-Binet IQs above 105. This figure, 35 per cent, is about twice the present enrollment.

Berdie found that 68 per cent of the superior high-school graduates (ACE IQ 120 and above) stated that they planned to attend college. Phearman's figures on Iowa high-school graduates at the same mental level who actually enrolled in college the year after graduation is quite comparable, being 68 per cent for male graduates and 60 per cent for female graduates. While these percentages are much higher than formerly supposed, it is still true that about one-third of the superior graduates do not go to college. Phearman also found that of the top 2 per cent, 96.7 per cent of the boy and 87.5 per cent of the girl graduates entered college in the September following graduation. Incidentally, Phearman's and Berdie's results tend to deny statements of long standing that for every high-school graduate who goes to college there is another just as able who does not. This might be true more or less of the average college student, but it is probably not true at all of the superior one. At least it is no longer true, if it ever was.

One is tempted to suggest that with improved guidance services and with increased use, and more intelligent use, of psycho-

⁵⁰ L. T. Phearman, "Comparisons of High-School Graduates Who Go To College with Those Who Do Not," *Journal of Educational Psychology*, 40 (1949), 405-14.

logical and achievement tests, more superior students are being discovered and properly advised than was formerly the case. While our concern for the present is with intelligence tests and their use in guidance work, it may not be amiss to point out that there are factors other than intelligence associated with college attendance, as the work of Phearman and Berdie shows. Among these are fathers' occupations, social class in general, geographical factors, and parents' financial position. It is interesting to note that at the very highest levels of ability, as Phearman found, these factors do not seem to have much to do with going to college. Perhaps this speaks well for intelligence and achievement tests, as well as for our guidance programs and our schools in general.

Differential aptitude tests. Our subject does not embrace aptitude tests in general. There are various kinds of special aptitude tests which fall outside the scope of intelligence testing, such as those in music, art, and the clerical and mechanical fields. There are also aptitude tests in certain professional fields, particularly in engineering, medicine, and the law. While the latter may largely be intelligence tests, at least in the sense that superior intelligence is required for achieving a good score, they make a point of emphasizing the intellectual abilities required or thought to be required in each particular field. It may still be a question of how much better a law-aptitude test is for law students than it is for medical students. If it is only slightly better, say 5 per cent, it is still worth while having separate aptitude tests for each specific field. On the other hand, if our interest is in the nature of intelligence rather than in purely practical matters, we are more impressed by the factors that these high-level aptitude tests have in common. This tells us that general intelligence as represented by an average score is the most noteworthy fact about intelligence.

If in addition to getting a good general score, a good general estimate of a student's intelligence, we can get differential aptitude scores of any value whatsoever, we are warranted in doing

so. We are warranted in doing so, so long as we do not have to sacrifice anything so far as our general score is concerned, and with the further reservation that we fully understand the merits or the limitations of the differential scores.

To a limited degree several of the tests already mentioned are differential aptitude tests. For example, the Wechsler and ACE tests yield verbal and nonverbal scores. The use of a timed test along with an untimed one, such as the Ohio State University test, might reveal something of additional value about a student. Some of the tests mentioned go a good deal farther in the direction of differential aptitude. The PMA (see Chapter VII) is our first and best example. The California Test of Mental Maturity has some of these same features, as well as others. As has already been stated, so far as *general academic achievement* is concerned we are about as well off to use the total score and forget about the subtest scores. For detailed accounts of differential aptitude testing the student is referred to such works as those of Anastasi, Cronbach, Greene, and Thorndike.⁵¹

Perhaps a word should be said about the use of general-achievement tests, or school achievement ascertained by any method, in assessing special aptitudes. One of the best signs of aptitude for mathematics, science, art, or music, for example, is the demonstrated ability to achieve in these areas. The outstanding student in mathematics and science might be considered a good candidate for an engineering college, or for graduate training in psychology or in any of the sciences. Similar statements could be made about other subjects and other fields.

ADDITIONAL REFERENCES

Alexander, A. M., "Teacher Judgment of Pupil Intelligence and Achievement Is Not Enough," *Elementary School Journal*, 53 (1953), 396-401

⁵¹ A. Anastasi, *Psychological Tests* (New York: The Macmillan Company, 1954); L. J. Cronbach, *op. cit.*; E. B. Greene, *Measurements of Human Behavior* (New York: Odyssey Press, 1941); R. L. Thorndike, *Personnel Selection* (New York: John Wiley and Sons, 1949).

- Assum, A. L., and Levy, S. J., "A Comparative Study of the Academic Ability and Achievement of Two Groups of College Students," *Journal of Educational Psychology*, 38 (1947), 307-10
- Berdie, R. F., "The Differential Aptitude Tests as Predictors in Engineering Training," *Journal of Educational Psychology*, 42 (1951), 114-23
- Brown, H. S., "Differential Prediction by the A.C.E.," *Journal of Educational Research*, 44 (1950), 116-21
- Carlin, L. C., "A Longitudinal Comparison of Freshman-Senior Standing," *Journal of Educational Research*, 47 (1953), 285-90
- Chappell, T. L., "Note on the Validity of the Army General Classification Test as a Predictor of Academic Achievement," *Journal of Educational Psychology*, 46 (1955), 53-55
- Clark, W. W., "Evaluating School Achievement in Basic Skills in Relation to Mental Ability," *Journal of Educational Research*, 46 (1952), 179-91
- Dolansky, M. P., "The Essential High School Content Battery' as a Predictor of College Success," *Journal of Educational Psychology*, 44 (1953), 361-65
- Doppelt, J. E., and Wesman, A. G., "The Differential Aptitude Tests as Predictors of Achievement Test Scores," *Journal of Educational Psychology*, 43 (1952), 210-17
- Gough, H. G., "Factors Relating to the Academic Achievement of High-School Students," *Journal of Educational Psychology*, 40 (1949), 65-68
- Gregg, G. W., "An Investigation of the Reliability and Validity of the Engineering and Physical Science Aptitude Test," *Journal of Educational Research*, 45 (1951), 299-305
- Hall, E. C., "The Proper Use of Test Results," *Elementary School Journal*, 54 (1954), 450-55
- Honzik, M. P., *et al.*, "The Stability of Mental Test Performance between Two and Eighteen Years," *Journal of Experimental Education*, 17 (1948), 309-24
- Joint Committee of the American Psychological Association, American Educational Research Association and National Council on Measurements Used in Education, "Technical Recommendations for Psychological Tests and Diagnostic Techniques," Supplement to the *Psychological Bulletin*, March, 1954 (Washington, D.C.: American Psychological Association)

- Lindquist, E. F., VanDyke, L. A., and Yale, J. R., *What Good is High School?* (Chicago: Science Research Associates, Inc., 1948)
- Mosel, J. N., "The General Educational Development Tests (High School Level) as a Predictor of Educational Level and Mental Ability," *Journal of Educational Research*, 48 (1954), 129-34
- Osborne, R. T., Sanders, W. B., and Greene, J. E., "The Differential Prediction of College Marks by ACE Scores," *Journal of Educational Research*, 44 (1950), 107-16
- Portenier, L. G., "Mental Ability Ratings of Honor Students," *Journal of Educational Psychology*, 41 (1950), 493-99
- Remmers, H. H., Elliott, D. N., and Gage, N. L., "Curricular Differences in Predicting Scholastic Achievement: Applications to Counseling," *Journal of Educational Psychology*, 40 (1949), 385-94
- Seigle, W. F., "Prediction of Success in College Mathematics at Washburn University," *Journal of Educational Research*, 47 (1954), 577-88
- Sheldon, W. D., and Manolakes, G., "Comparison of the Stanford-Binet, Revised Form L, and the California Test of Mental Maturity (S Form)," *Journal of Educational Psychology*, 45 (1954), 499-504
- Shuey, A. M., "Choice of Major Subject as Related to American Council Examination Scores and College Grades," *Journal of Educational Psychology*, 41 (1950), 292-300
- _____, "Improvement in Scores on the American Council Psychological Examination from Freshman to Senior Year," *Journal of Educational Psychology*, 39 (1948), 417-26
- Thorndike, R. L., "Community Variables as Predictors of Intelligence and Academic Achievement," *Journal of Educational Psychology*, 42 (1951), 321-38
- Tyler, F., "Comments on the Correlational Analysis Reported in 'Intelligence and Cultural Differences,'" *Journal of Educational Psychology*, 44 (1953), 288-95
- Wallace, W. L., "The Prediction of Grades in Specific College Courses," *Journal of Educational Research*, 44 (1951), 587-97
- Wrightstone, J. W., *What Tests Can Tell Us about Children* (Chicago: Science Research Associates, 1954)

EDUCATION OF EXCEPTIONAL CHILDREN

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WITHIN THE LAST DECADE or so we have witnessed an awakening to the challenge of education for extreme deviates in our school population. There is increasing realization (1) that many children in this category are at a distinct disadvantage in our regular schools and (2) that they require special training and services over and above those provided in the regular curriculum. Some handicapped children cannot attend regular schools at all. Many more are at a great disadvantage in the more or less competitive atmosphere that prevails. The majority of such children do and should attend regular schools, but the regular program is not sufficient for their needs.

Considerable impetus has been given to this movement by the organization of divisions of special education in the various state departments of education. Most states of the Union have or are planning to have such divisions. Many of the divisions are supported by separate legislative appropriations for the development and implementation of programs. It is a customary pattern for the division of special education to reimburse local school districts for the added cost of special education. This may include such items as transportation to special training centers, supervision of special education programs, clinical and diagnostic services, teaching of the homebound, speech-correction work, the employment of special teachers and therapists, and the purchase of special equipment. These divisions of special education at the

state level provide leadership of various kinds through consultative, advisory, and fact-finding services.

No pretense is made of covering all the fields of special education in this chapter, or of covering any one of them adequately. An attempt is made to present some of the major problems and issues incident to the major fields. It seems desirable to undertake this, first, because many regular teachers today work in school systems that maintain programs of special education and must work with special teachers. Where no special program exists, it is all the more desirable for the regular teacher to have some orientation to the field. About 10 per cent of the school children in the United States, or about 3,000,000, deviate from the normal enough to require special educational services. This includes the mentally and physically handicapped, the gifted, and the speech-handicapped, but not those who are emotionally disturbed and socially disoriented. In the second place, the education of handicapped and gifted children involves certain psychological and educational principles and problems that are applicable to the education of all children.

The Physically Handicapped Child

There are various provisions for the education of physically handicapped children. Today most of our larger cities either have or are actively engaged in establishing day schools for such children. These schools are commonly run as separate units. One such school may serve a city of 500,000 or more. The crippled children are transported from all parts of the city to the center; the schools are usually well equipped and especially well run. The education of crippled children in rural areas and towns and smaller cities presents a serious problem. There are not enough crippled children to justify, by present standards, the special equipment, the trained teachers, therapists, and medical personnel required for the operation of an effective program. Moreover, if the expense were not a problem, it would still be a questionable undertaking. Everywhere, we Americans think,

education should be socialized. Except in centers of considerable population, perhaps 100,000 and above (including the accessible surrounding area), there would not be enough crippled children of like age or grade to form social units. A center of 100,000 might be expected to provide from 50 to 75 eligible children of all ages.

The problem of the smaller community is met at present, to an infinitesimal degree, by hospital schools. These schools generally provide 24-hour-a-day care for the children, as does the institution at Jamestown, North Dakota. Except where such a school is attached to a medical center, as at the State University of Iowa—where somewhat more adequate facilities are provided—hospital schools operate very much like the day schools for crippled children. The hospital school is quite expensive to operate, requiring about one employee per child. The expense of maintaining a child in such a school is ten times as great as the education of a normal child. For this reason hospital schools have been held to be justified as experimental centers and centers for the training of teachers, therapists, psychologists, and medical personnel.

For the day school, children are generally selected on one or both of two bases: (1) that by reason of the nature and the severity of their crippling condition they are unable to attend regular schools; and (2), that they have a crippling condition that should respond to therapeutic treatment, even if they are physically able to attend a regular school. The hospital school gives preference to children who do not have access to a day school. Both types of schools tend to give preference to children who have the mental ability to cope with the academic side of the school program. Nationally speaking, by these standards, there are tens of thousands of eligible children who do not have access to educational provisions of this kind.

The operation of a school for crippled children is a complicated matter. Even the teaching of the "three R's" to children that are handicapped in so many ways poses a difficult task. Some have little use of their hands; some cannot talk intelligibly or can scarcely do so; others cannot get into or out of a wheelchair by

themselves. In addition to orthopedic crippling and speech handicaps, some children have sensory defects. Teachers need both patience and ingenuity. There is speech therapy and physical therapy. Recreational activities, social development, and emotional adjustment present greater difficulty than in the case of unhandicapped children. Rehabilitation is slow. Take a cerebral-palsied child who cannot walk at all. To enable him to walk alone and without aids within three or four years is quite an accomplishment—not to walk well or normally, but to walk enough to get about from place to place. Or take the case of a child who drools, who cannot talk intelligibly, or feed or dress himself. It is a remarkable thing to teach him to swallow, to speak—perhaps not well, but well enough to be understood—to feed and dress himself and thus gain a measure of independence. Frequently this is the kind of problem the physical therapist and the speech therapist is up against.

The severely crippled child grows up under severe limitations in social participation with other children. In the home, in the back yard, along the walks, on the playground, normal children typically have rich experiences in social interaction, experiences that lead to social development. In the home of the handicapped child there is a danger of one of two extremes: overindulgence, excessive sympathy, waiting on the child to an extent that increases his dependence, or on the other hand, rejection, neglect, and apology. More successfully than is true with normal children, the school for physically handicapped children must provide for total development. Most likely such children have had inadequate social experiences before entering school. Parents and others may have done all sorts of things for the crippled child without his being expected to reciprocate.

A recent investigation by Larson highlights the social deprivation of the physically handicapped child. With the assistance of specialists in child care and development he prepared a list of almost a hundred experiences that preschool children should have. His list of experiences included such things as number of playmates; visiting with playmates in his own home and their

homes, visiting in other homes with parents; attending parties, attending church and Sunday school; participating in programs; attending picture shows, including drive-in theaters; visiting parks, woods, swimming pools, local factories, a fire station, the circus, fairs, sporting contests, a farm; accompanying parents to grocery stores, department stores, large cities, on vacation trips, to museums, concerts, and picnics; riding on elevators; helping with household duties; talking on the telephone, spending the night in a hotel; spending money, talking to parents; listening to stories. A number of items also dealt with children's books, magazines, records, and play materials. He then compared 135 physically handicapped children, ages 3 to 6, with 135 physically normal children matched in age, type of community, and socioeconomic status with the handicapped, as to these items of experience. The items were grouped into certain areas of experience, such as socialization, recognition (including parental attention), experiences outside the home, and general knowledge. In every area, and on the great majority of individual items, he found large and significant differences between the physically handicapped and the physically normal groups, in favor of the latter. Not a single item yielded a significant difference in favor of the handicapped group.¹

It seems certain that parents, were they made aware of the importance of these experiences in the life of a child, could to a large degree make up for these deficiencies. Parental education and guidance thus becomes one of the duties of the school for crippled children. *Acceptance* of the handicapped child is much more important than pity. To accept himself and the conditions of his life, he must be accepted by others.

Emotional security in the affection of others, feelings of adequacy that can only be realized through achievement, genuine belonging in a peer group, self-realization, self-worth, are needs of crippled children just as they are needs of normal children and

¹ E. LeR. Larson, "Experiences of Physically Handicapped Children Ages Three through Six," Doctor's Dissertation, State University of Iowa, 1954.

adults. For the crippled child, there are greater hazards to their realization. The child must achieve these ends himself. We cannot satisfy these needs for him, nor can we for any child. We can only assist him by providing the right conditions. Too much help, too much concern, sympathy, protection, and pity can be as detrimental as neglect or too little help.

These schools are equipped with many interesting devices for providing exercise for palsied muscles. There are stationary bicycles with resistance controls, interesting devices and games for exercising tongue and mouth and hands, tables with built-in stalls for the support of children who cannot stand unaided, at which they can work with sand, maps, paints, and so on, as well as exercise weak muscles. Many cerebral-palsied children tend to walk with a shuffle and a scissors gait in which the knees bend inward or cross each other. Some schools have long walkways equipped with hand railings for support, with a partition a foot or so high to keep the knees apart and cleats along the floor to induce the child to raise his feet as he walks. There are electric typewriters for palsied hands and "sightsaving" books and materials for children who are partially sighted.

One of the really fine additions to the training of crippled children is the manual-arts shop. Opportunity is provided for work in wood, leather, ceramics, metals, and so on. Many interesting adaptations are made to accommodate crippled children. The accompanying diagram shows a device, adjustable in height, that enables children who cannot otherwise do so to stand up to lathes and other tools. To an extent, such a program provides some degree of prevocational training. Its main purpose, however, is therapeutic—physical therapy and psychotherapy. The opportunity is provided for the exercise of weak muscles in a purposive and creative way. The child's concern is to construct something he is interested in. The school's purpose is the development of muscular co-ordination and strength, and the development of a sense of self-realization and self-worth. As one instructor put it, "I do not want this program evaluated in terms of what the

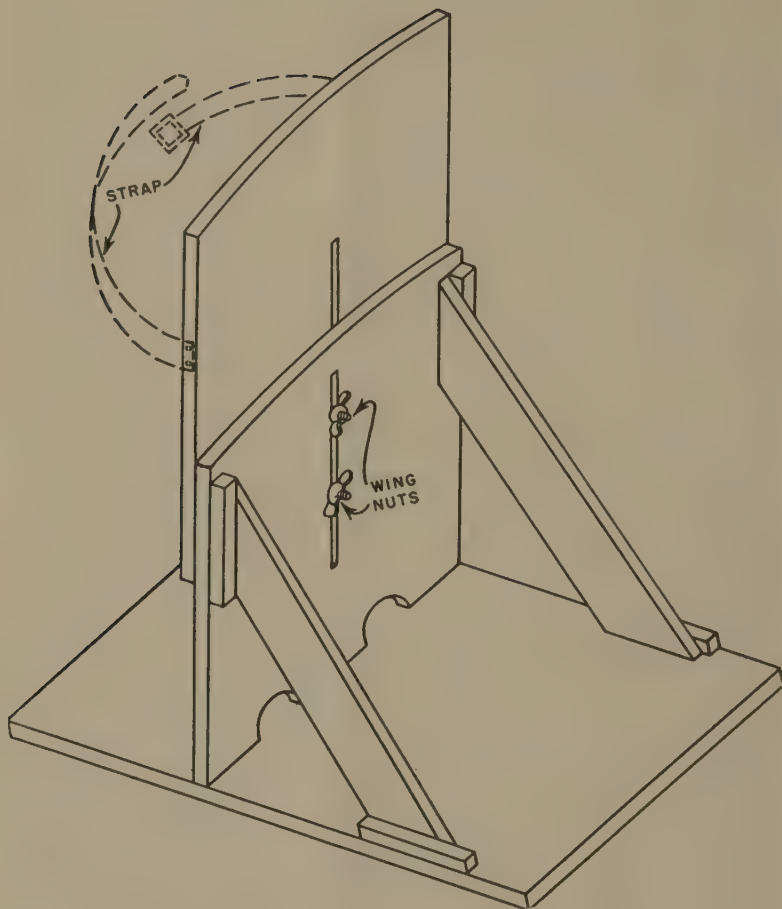


Fig. 10. Stand-up Board. (Courtesy V. A. Bonfig.)

children can make, but in terms of the effect making something has upon them."

Cerebral Palsy. A cerebral-palsied child is one whose muscles are weakened by brain damage. While the injury may be sustained after birth, in the great majority of cases, perhaps 90 per

cent, the injury occurs at birth or at some time before birth.² There are many chances for such injury. They are by no means confined to obstetrical injury, such as that caused by the use of instruments or severe pressures applied to the head. Injuries of this kind account for only a small proportion of the cases. Asphyxiation, associated with excessive use of drugs and prominently associated with breech delivery—one of the consequences of which may be the interruption of blood supply (and oxygen flow) to the brain by the pinching of the umbilical cord between the infant's head and the cervix of the mother—is one of the major causes of brain damage. There are other causes of brain damage—for example, German measles contracted by the mother at a certain critical period during pregnancy—but the one given is sufficient to suggest that cerebral palsy is not basically chargeable to obstetrical carelessness.

The extent of the crippling varies widely, depending upon the extent and the location of the brain damage. Few muscle groups or many may be involved. In addition to the muscles, one or more sense organs may be involved, and even the intelligence. As Perlstein points out, the brain is not only the seat of muscular control, but also of that of emotion, sensation, intelligence, and personality. Thus it is clear that a cerebral-palsied child can be affected in many ways. Spastic paralysis, a term sometimes popularly used synonymously with cerebral palsy, is only one kind. Another large class is the athetoid. Much of the spastic's difficulty in muscular control arises from the fact that when he attempts to contract a muscle or a muscle group, the antagonistic muscles do not relax as they do in a normal person, but contract also and thus interfere with the execution of movement. The athetoid is characterized by irregular, unorganized, involuntary movement. The affected parts of the body tend to be continually in motion, except during complete relaxation. Spasticity results from damage to the motor area of the cerebral cortex; athetosis, from damage in the basal ganglia, extrapyramidal tracts, or brain

² M. A. Perlstein, *The Problem of Cerebral Palsy Today* (New York: Association for the Aid of Crippled Children, 1947).

stem. These two classes account for well over 60 per cent of the cases of cerebral palsy. Ataxia is a third type. It is characterized by general lack of co-ordination, especially in locomotion and postural adjustments. It results from injury in the cerebellum. Two other types are recognized: tremor and rigidity. The former, resulting from injury or disease of the basal ganglia, is characterized by involuntary, reciprocal contractions. This type is usually found only in adults. Rigidity is sometimes associated with a diffuse hemorrhage in the brain, but more often with encephalitis. It is manifested by a lack of elasticity of muscles.³

How many cerebral-palsied children are there? Phelps has proposed a kind of statistical rule to the effect that there are, on an average 7 cerebral-palsied children born annually per 100,000 in the general population.⁴ Of these, one dies before reaching school age. This would give us 60 such children per million, or about 10,000 per year, in the United States. Thus there should be about 200,000 cerebral-palsied children and youth under 20 years of age. At least one-third of these are eligible for education in special schools, by present practices. About one-third are feeble-minded, or appear to be. (It is frequently quite difficult to secure an intelligence score that commands much confidence.) Perhaps another third are either handicapped so slightly as not to require special educational facilities or so severely that the prospect of helping them under present conditions is not sufficient to warrant accepting them. This would leave about 66,000 children under 20 who are eligible. No more than a small proportion of these are at present receiving the special educational services they require and which we know how to give.

There is need of better understanding of the causes and treatment of this unfortunate affliction, particularly upon the part of parents of cerebral-palsied children and teachers in general. A recent investigation based upon interviews with parents attests to the lack of understanding upon the part of parents, as seen in

³ W. M. Phelps, *Cerebral Palsy in New York State* (New York State Cerebral Palsy Association, 1946).

⁴ *Idem*, *The Farthest Corner* (Chicago: National Society for Crippled Children and Adults, 1944).

answers to questions like: Do you expect your child to be completely cured? Do you expect him eventually to be able to walk normally? Do you think surgery would help? Do you think your child is handicapped as a punishment to you? ⁵

It is frequently said that the handicapped child is a normal child with a handicap. It is of course our aim to treat such children from the earliest months of life as normal children with a handicap, with the hope that most of them will grow up to be normal children and adults with or without a handicap. At present, however, the expectation is that the handicapped child will present a picture of multiple handicaps. Many have more than one physical disability. In addition, some of the physically handicapped are also handicapped mentally. About one-third of the cerebral-palsied are seriously retarded mentally. Then there is the further fact that the original handicap may lead to other handicapping conditions which may in some cases be as "crippling" as the original condition.

In his work as a college teacher the writer has become well acquainted with several cerebral-palsied students. Such students usually find college life rather congenial, perhaps because of the understanding attitude of their fellow students and their instructors. Nearly all of them have appeared to be quite disturbed and anxious about the future. Most of them have shown signs of serious emotional maladjustment. With perhaps no more than a single exception, it has occurred to the writer that the original crippling condition was not their most serious barrier to professional success and to normal social and family life. Rather, their attitudes, their inability to accept themselves and their conditions of life, their anxieties, and their general maladjustment seem to have created greater hazards than the physical symptoms. It is as if they lacked the hope and optimism commonly associated with youth. ⁶

⁵ D. B. Ray, "A Study to Develop a Guide of Education for Parents of Cerebral Palsied Children," Master's Thesis, State University of Iowa, 1951.

⁶ S. J. Glick, "Vocational, Educational, and Recreational Needs of the Cerebral Palsied Adult," Hunter College Chapter, International Council for Exceptional Children, New York City, 1953.

Rheumatic fever. Aside from the fact that rheumatic fever is a distressing form of illness, our principal fear of this disease grows out of its association with heart damage. "The problem of heart disease in children is primarily that of rheumatic fever and rheumatic heart disease. Ninety-five per cent of all heart diseases in childhood are the direct result of rheumatic fever."⁷ The incidence of this disease varies somewhat with geographic regions. It is said to be highest in the Northeastern states and lowest in the Southwest. The committee of cardiologists estimated in the report just referred to that in New York City 0.75 per cent of the school children either had rheumatic fever or had had it as evidenced by residual heart damage.

The prevailing opinion seems to be that rheumatic fever is associated with hemolytic streptococcal infection in the upper respiratory tract. In the more acute phases of the disease, in which the child is quite ill, he may be "afflicted with serious symptoms such as high fever, migrating joint and muscle pains, rapid heart action, respiratory embarrassment, drowsiness, weakness, profuse perspiration and prostration."⁸ These acute phases may last from perhaps three to six weeks. There are two or three aspects of the disease that make it of special concern to teachers and school authorities. One is the tendency toward recurrences. The recurrent cycles may appear from a few months to a year or more apart. This aspect of the disease, which may present a serious problem of adjustment to the child and the parents, marks it off from such crippling conditions as cerebral palsy and poliomyelitis, where the afflicted child is not expected to get worse nor to have a recurrence.

Because of the tendency toward recurrences, teachers and school health authorities need to be especially watchful of symptoms in children known to have suffered from the affliction. In a large school system—such as that of New York City—which main-

⁷ *Report of the Sub-Committee on Cardiac Classes and the Care of Cardiac Children* (New York: Board of Education of the City of New York, n.d.).

⁸ *Ibid.*, p. 31.

tains a network of classes for cardiac children—the child may receive a daily routine check by the school nurse or physician. Moreover, children who are known to have sustained cardiac damage may require a special educational program. In smaller communities where special cardiac classes are not available, teachers should scrupulously follow the physician's recommendations regarding children known to have resulting cardiac damage.

New York City maintains about a hundred special classes for heart-damaged children. The committee studying conditions in these classes made, on the whole, a favorable report. In general the teachers had had special training for their work. Transportation facilities left something to be desired, chiefly because of the circuitous routes the vehicles frequently took in order to pick up as many cardiac children as possible on a single trip. The principal complaint concerned the educational curriculum itself. This is referred to here because the same defect is likely to appear in almost any special educational program, the "opportunity room," classes for the mentally retarded, as well as classes for the physically handicapped. This was to the effect that inasmuch as these children were on a restricted program—from 45 minutes to 1½ hours were spent in complete rest, for example—the tendency was to maintain the so-called basic part of the daily program to the neglect of enrichment and activities. Individual seatwork predominated. The importance of socialization of schoolwork for handicapped children is discussed presently.

Poliomyelitis. Of the major causes of crippling this is probably the best known to the average teacher. The etymology of the word—*polis*, gray, *myelos*, marrow, and *itis*, inflammation—tells us a great deal about the character of the disease. The virus has an affinity for the gray matter of the bulb and the upper cord, producing bulbar poliomyelitis, and for the anterior horns of the spinal cord.⁹ The latter are recognized as the motor centers in the spinal cord; the gray matter of the bulb, as the motor centers

⁹ J. E. W. Wallin, *Children with Mental and Physical Handicaps* (New York: Prentice-Hall, 1949).

for throat, chest, and heart. The incidence of fatality is much greater with the bulbar type.

Wallin reports that there are about 10,000 new cases in a normal year in the United States. The following are some of the figures for epidemic years: 1916, 29,000; 1946, 25,191; 1948, 27,658. The fatality rate is variable. According to Wallin, it was 7.1 per cent among the 19,029 cases reported in 1944, and 3.1 per cent for the Maryland cases in 1941.¹⁰

The outlook for children stricken with this disease is much brighter than it was earlier. Paralysis in the limbs affected is usually partial rather than total. After the cessation of muscular tenderness a certain amount of spontaneous recovery normally ensues. Muscular strength thus improves for a period of about two years. With the use of the Sister Kenny method of treatment and the use of certain relaxant drugs, together or singly, the untoward effects of muscle atrophy and tendon shortening are generally mitigated. But with the most enlightened treatment the outlook is not promising in the case of muscles that do not respond favorably during the first few months. The rate of recovery decreases with the lapse of time. It is less in the second six months than in the first six, less in the third than in the second, and so on.¹¹

The education of the child, if of school age, should be resumed as soon as his physician declares that he is ready for it. The purpose of this is not so much to prevent him from getting behind in his studies as to keep him occupied with constructive activities. Schools for crippled children are, of course, ideal. Here he will get the therapeutic treatment he needs for continued physical restoration and the social contacts with other children that are so vital to the handicapped, who cannot maintain such contacts on the playground and in other places where children gather. Here also he will be occupied with daily schoolwork that helps to prevent further "crippling" through idleness, self-pity,

¹⁰ *Ibid*, pp. 464-65.

¹¹ Cf. R. H. Berg, *Polio and Its Problems* (Philadelphia: J. B. Lippincott Co., 1948).

pessimistic rumination, and loneliness. The seriously crippled child cannot find the interesting and worth-while things to do that are available to a normal child. Trained teachers, therapists, and other specialists are conscious of his psychological needs and can provide what he requires in the way of morale-building and social development. Without spoiling and pampering him, they can allay his anxieties and give him the affection he needs.

Where such schools are not available (and that includes most communities), a child may attend regular schools and receive his physical therapy at a local hospital or clinic. Some local hospitals maintain postpolio wards where teachers are regularly employed to provide instruction. In fact, hospital authorities generally recognize the therapeutic value of school activities. Some of them provide educational facilities for children convalescing from many kinds of illness. If the child is so severely crippled that he cannot attend a regular school, and no hospital or special school facilities are available, about the only recourse is to carry on his education in the home. Many school systems maintain programs of education for the homebound. In some states the added cost of such programs is borne by the division of special education of the state department of education. At best, instruction in the home is an expedient. For one thing, it does not provide for the socialization of the child. It serves its best function in the case of children who are confined to their homes for relatively short periods of time; that is, where there is the expectation that they will soon return to normal social life. In addition to visiting teachers for the homebound, many schools provide teachophones or similar devices that give two-way telephonic connection between the child and the classroom.

Epilepsy. This is generally regarded as a disease of childhood and adolescence. Perhaps 75 to 80 per cent of the victims suffer their first attack before the age of 20, two-thirds before the age of 15. Estimates of the number of persons in the general population who are subject to epileptic seizures run as high as 600,000 or 700,000—about 0.5 per cent. The number of seizures (grand mals) per year is highly variable. One investigator reported that

for a sample of 1567 epileptics, 25 per cent had less than 5 a year; 50 per cent, less than 15; 75 per cent, less than 50, some, more than 1000.¹²

While this strange and little-understood malady cannot be cured, in the usual meaning of this term, it can, in the majority of cases, be successfully managed. (In some instances, symptomatic epilepsy can be cured by removal of scar tissue in the brain, or brain tumors.) Wallin, who has carefully reviewed the literature on this subject, estimates that 75 per cent of the seizures can be eliminated in 75 per cent of the cases by scrupulous use of anticonvulsant drugs, such as phenobarbital. Psychological management includes provisions for a harmonious, tension-free environment with many interesting, healthful, and challenging activities—outdoor life, gardening, camping, books, entertainment, hobbies, and creative activities. Some who cannot find such an environment at home do so in colonies.

It has seemed necessary to institutionalize a considerable number of epileptics, some 25,000 to 30,000. Generally, these are persons who have frequent attacks that have not been alleviated by treatment, those who are feeble-minded or psychotic, or those who have no other place to go. A relatively high percentage of epileptics are feeble-minded, though this estimate will depend a good deal on the definition. Perhaps about one fifth of them achieve IQs below 70. This is more than six times the percentage of those in the general population who fall below this figure. Such a high percentage of low scores would, of course, pull the mean IQ of epileptics down considerably below the general population mean—by some estimates, by much as from 10 to 25 points.

With the exception of those who are severely retarded in mental development and those who are subject to frequent attacks which have not responded to treatment, epileptic children of school age should attend regular schools. The seizures do not last very long, perhaps less than two minutes, on the average, in some cases up to five minutes. Upon regaining consciousness the child may seem exhausted, and somewhat confused for a time.

¹² Wallin, *op. cit.*, p. 364.

During the seizure he does not require much assistance. A folded handkerchief can be placed between the molars to prevent biting of the tongue and the head be turned to one side to permit the escape of saliva. The seizures should not be especially disturbing to class routine if they do not occur too often. A calm, matter-of-fact attitude upon the part of the teacher is crucial in such cases. Improper attitudes can be as detrimental to the child's well-being and future happiness and success as the direct effect of the disease itself.

... the morbid sensitivity about being afflicted with a mysterious and repulsive malady may be more inimical to the subject's welfare and may constitute a greater bar to his happy social adjustment than the handicap of the physical attacks.

Most of the psychological difficulties, adjustment problems and maladjustments ... are probably produced less by the ravages of the disease itself ... than by the derogatory attitudes of parents, siblings, playmates, neighbors, and others, and the ill-advised and misdirected treatment or maltreatment to which many epileptics may be subjected.¹³

The visually and acoustically handicapped. The *Social Work Yearbook* for 1951 estimates that there are 250,000 blind persons in the United States, 10 per cent (25,000) of whom are under 20 years of age. The same source estimates that there are 37,000 deaf children under 20. Many authorities feel that the figures for both the deaf and the blind are too low. The education of these children is a technical and specialized job, especially that of the deaf. The regular teacher is not likely to have much contact with either group. For the most part those who are in school attend state or private boarding schools or local special schools. Of course only our larger cities have enough blind and deaf children to warrant the maintenance of local schools. Either the estimates of the incidence of deafness and blindness are much too high or there are many afflicted children not in school, unless workers

¹³ *Ibid.*, pp. 380-81. Quoted by courtesy of the publishers. See also E. M. Bridge, *Epilepsy and the Convulsive Disorders in Children* (New York: McGraw-Hill Book Co., 1949).

have been unable to obtain complete figures. For example, data reported by Heck indicate that in 1951 California had 162 children enrolled in state schools for the blind, and 152 in local schools; Michigan, 124 and 121, respectively; Ohio, 189 and 117; Illinois, 193 and 80.¹⁴ In 1953 the State of Iowa, which has little in the way of local facilities for educating the visually handicapped enrolled 167 pupils between the ages of 2 and 20 in the state Braille and Sight Saving School, of whom about 60 per cent were educationally blind; that is, were taught Braille. The nation-wide picture for the deaf is somewhat the same as for the blind, though enrollments tend to be larger.

The education of the blind goes forward rather well. In contrast with the deaf, the blind enter school with only a little retardation in speech or in mental development as judged by intelligence-test performance. The normal blind school child learns Braille readily. However, he is at a disadvantage in comparison with sighted children in two important respects: the amount of material set in Braille is strictly limited; and the reading of Braille remains a slow process. It takes about three times as long to read a hundred words of Braille as a hundred words of print. In recent years talking books, which may be had without cost to the blind person and are in considerable quantity, have been a great boon, and these are also available to adults. As the child progresses through school the amount of material in Braille becomes less and less adequate. This lack of material is especially acute at the college level. Here the student must have someone read to him a great deal of the time; this service is usually provided at public expense.

The education of the deaf is a much more difficult matter. Here we are thinking chiefly of deaf-born children or those who become deaf before acquiring speech. They enter school with woefully inadequate language facility, which imposes severe limits on *communication* and *thought*. Typically, they cannot make some of the sounds used in speech, and since they have no

¹⁴ A. O. Heck, *The Education of Exceptional Children* (Ed. 2.; New York: McGraw-Hill Book Co., 1953).

ready way of knowing the sounds they do make, they have little voluntary control over sound production. Not only must the deaf child learn to make speech sounds and combine them into intelligible words, he must also learn to "read" the speech of others. This at best is difficult. Apparently the eye cannot analyze facial movement as readily as the ear analyzes the sounds produced. There are also minor inconveniences incident to poor light, to the speaker's having his head turned the wrong way, to having to keep up with the person who is speaking, which may be quite difficult in a social situation.

This is not the end of the deaf school child's difficulties. He must learn the syntactical relationships among words, a task the hearing school child has pretty well mastered, at least functionally, with scarcely so much as having been conscious that he was doing so. As was noted in Chapter VI, there are many words and concepts that give the deaf child a great deal of difficulty, "if," "as," "because," "but," "when," and so on. The personal pronouns are particularly troublesome. "You," "I," and "me," for example, can refer to you, the speaker, or to me, the listener.

The typical deaf child remains severely retarded in school. It is rather a cruel fact that he does not attain normal proficiency in reading, the one field of communication that is readily open to him for both educational and recreational purposes. It is as if he were unable at school age to overcome the handicap of earlier limitations in general experience and language development. It seems possible that once a start is made in reading, this could be made a means of acquiring the experiences and the command of language which were denied him at an earlier age. Apparently this has not as yet been fully realized. The deaf child appears to do relatively better in the early grades, where there is considerable emphasis on learning skills, than in later grades, where there is a greater demand for abstraction and generalization.

(1) *The partially sighted.* The regular teacher has considerably more acquaintance with partially sighted children than with the blind. There are more of them and they are more closely identified with the normal school program. There is a useful

statistical rule to the effect that we should reckon four partially sighted children to one blind child. This would give us about 100,000 partially sighted persons under 20 years of age. As customarily defined, a partially sighted pupil is one whose vision in the better eye, after correction, tests between 20/70 and 20/200. Those with less than 20/200 are educationally blind and are taught Braille. A person who tests 20/200 can see at 20 feet what a normal person (testing 20/20) can see at 200 feet.

Sightsaving classes and sightsaving instruction have become a rather familiar part of the educational scene. "Sightsaving" is an engaging phrase, though one with a touch of "propaganda." Most visual defects are the result of abnormal growth, disease, or accident. If one went out to find a school child who had produced a serious visual defect by using or misusing his eyes in school, he probably would discover it to be quite an undertaking. We cannot *in general* appreciably reduce the incidence of such defects by lighting or other procedures. If there were no schools and no books at all, there would probably be about as many children with defective vision as at present. But of course proper lighting and proper printing may add a great deal to the comfort and the aesthetic enjoyment of the classroom. There is a current opinion which holds that visual defects of the ordinary refractive kind are attributable to poor posture associated with poor lighting and seating. This may have some merit.

There are partially sighted children with very weak eyes—where the balance between seeing and not seeing is a delicate one. There may be children with progressive defects whose condition could probably be aggravated by other than closely guarded use of the eyes. Perhaps such cases are in the minority among our 100,000 candidates for sightsaving instruction. The demand for such instruction comes chiefly from the fact that these handicapped pupils do not have sufficient vision to enable them to proceed with their education in the normal way. Sightsaving instruction enables them to capitalize on the limited sight they have and helps prepare them for the world of vision. Perhaps sightsaving instruction embodies more the idea of making

the best use of the limited vision the pupil has than that of preventing his defect from getting worse, though the latter is a feature of the work.

Let us consider some of the more important features of sight-saving instruction. In a sightsaving room there are several interesting features. Care is exercised to provide an abundance of diffuse light and to avoid glare. Blackboards are equipped with light-colored shades that can be pulled down when the boards are not in use, to prevent absorption of the light. Books and other materials are printed on nonglare paper. The print is quite large, much larger than primer type; large, soft-leaded pencils are used; paper is ruled in lines about an inch apart. Oversized crayon is used for board work. The pupils are encouraged to make large letters, figures, and drawings. Some schools are equipped with specially constructed typewriters with large type. Desks with adjustable seats and tops are used. There is more emphasis upon oral instruction, oral arithmetic, for example. Considerable use is made of the talking books used by the blind. The teacher can request and receive these without expense to the school. Children assigned to sightsaving classes can attend regular classes in certain subjects, social studies for example. In such cases the special teacher makes the assignments and supervises the preparation. It seems desirable to have these pupils mingle with normal pupils as much as is compatible with their special needs and requirements.

Heck concluded that in 1948 there were 605 teachers of sight-saving classes in the United States, distributed throughout 34 states. In their classes 6509 elementary and 1204 high-school pupils were enrolled. These figures may not include teachers and partially sighted pupils connected with state schools. In any case they obviously fall far short of the estimated number of partially sighted children. We should not conclude that the others are being neglected. Perhaps many pupils toward the better end of the range 20/70—20/200 can be satisfactorily educated in regular classes by enlightened procedures. In smaller cities, towns, and rural areas there are not enough such pupils to form classes. In

fact only the larger cities would have enough to form classes of pupils of like age. The writer does not know how many county school systems, or school systems in cities under 50,000 population, have some amount of sightsaving materials or a teacher or a supervisor who can give instruction in their proper use. The number may actually be quite considerable. In all cases the sight-saving teacher, and the regular teacher who may have a partially sighted pupil in class, should seek and follow the advice and recommendations of the child's physician.

(2) *The hard-of-hearing pupil.* The line between the inability to hear speech sounds, even with a mechanical aid, and the ability to do so even just enough to know what such sounds are like may be a narrow one in terms of decibels, but it is as wide as a gulf educationally. If the child has enough hearing for purposes of language development and has had it from an early age, even though he cannot hear much of what is said around him, he can develop more or less normal speaking ability and should experience no great difficulty in learning to read and making progress in his other school subjects, at least in comparison with the deaf. Hard-of-hearing children show no marked deficiency in intelligence-test performance. When proper attention is given to their handicap they should show no serious retardation in school. In these respects they may progress almost as well as hearing children.

O'Connor and Streng recognize four groups of acoustically handicapped children, varying in degree.¹⁵ Group A, characterized by a slight loss (average loss of 20 decibels or less in the speech range—512-2048 cycles per second—in the better ear) require no special consideration beyond preferential seating in the classroom. Children in Group B show a moderate loss, of from 25 to 50 or 55 decibels in the speech range in the better ear. These children, in addition to favorable seating, may require speech training and training in speech reading. A hearing aid

¹⁵ C. D. O'Connor and A. Streng, "Teaching the Acoustically Handicapped," in *The Education of Exceptional Children*. National Society for the Study of Education, *Forty-Ninth Yearbook* (1950), Part II.

may be needed for those with a loss greater than 35 decibels. Children with marked losses are placed in Group C. Losses for this group range from about 55 up to 65 to 75 decibels. In this range, children do not learn speech without aid if the loss has existed from early childhood. These authors regard such children as educationally deaf, since they require special speech training even after training in the use of a hearing aid. The loss for children in Group D is called profound—losses ranging from 70 to 75 decibels upward. These children must learn language and learn to communicate without the aid of sound. There is no place for them in the public schools, except in those cities which maintain special day schools for the deaf.

According to O'Connor and Streng a 35-decibel loss marks the approximate boundary between being able to get along in the social interchange of ideas and not getting along readily. A child with this degree of loss may do very well in face-to-face situations but begin to experience some difficulty in following conversation in group situations. As the loss increases upward from this point, children's difficulties increase. These authors further state that normal conversation is carried on at about a 60-decibel level. If the child's loss equals or approximates 60 decibels in the speech range in the better ear, the chances are against his acquiring speech without aid.¹⁶ They estimate that about 5 per cent of children of school age have some degree of hearing loss. This would amount to about 1,500,000 school children. Doubtless in many, perhaps the majority, of these cases the loss is not educationally serious. But the condition is sufficiently extensive to demand constant vigilance upon the part of school authorities, especially since hearing losses in young children may so readily go undetected.

The Mentally Handicapped Child

Evidently, a mental handicap is not an all-or-none proposition. It is a matter of degree. It is also relative to some reference point.

¹⁶ *Ibid.*, p. 155.

In a professional school a student with an IQ of 115 may be handicapped; in the public schools such a student is superior. The number of handicapped children decreases as the seriousness of the handicap increases. The number scoring IQs of 80 is less than the number scoring 90; fewer score 70 than 80; 60 than 70, and so on. In fact, we tend to define seriousness in terms of frequency. One reason 60 is worse than 90 is the fact that only about 1 per cent score less, whereas 25 per cent score less than 90.

In school practice the terms "slow learners" and "mentally retarded" are currently employed to designate two levels of handicapping. Some such distinction is useful because the two levels present different educational problems as these are conceived at present. The slow learner follows the regular curriculum and is normally a member of a regular class. He may from time to time receive special help. This is in part remedial in nature. If he is placed in a special group, this is regarded as a temporary arrangement; it is anticipated that after a period of remedial instruction he will return to his regular class. Of course his teacher gives him somewhat different tasks or assigns him easier material, and may accept a lower performance, but essentially he follows the same curriculum and participates in the same learning projects as normal children.

The special programs for the mentally retarded are not remedial in character. If authorities give mentally retarded children a special program and have made the right diagnosis, there should be no thought of their subsequently joining a regular class. At least this is not the objective of the instruction. Our objective should be to provide a total and complete educational program for such children. Where we attempt to draw the line between slow learners and the mentally retarded should depend upon what we are prepared to do. While the IQ is the central factor in placing a child in the mentally retarded group, it should not be the sole factor, especially if he is near the border line between the two groups. In IQ terms perhaps the upper limit should not be higher than 75 (Stanford-Binet). Slightly more than 5 per cent of the children in the general population achieve IQs at and

below this point. If we take 70 as the cutting point, we will have about 3 per cent. Between these two points such factors as emotional stability, social development, and group adaptability should be the deciding ones. Thus the mentally retarded group may be as large as 5 per cent.

What is said here implies some kind and degree of segregation of mentally retarded pupils. There are at least two reasons for this. In the first place, it is difficult to make these extreme deviates a part of the normal group in a true social sense. They do not become, at least fully, a part of the socialized learning activities, in the sense of participating in the co-operative planning of the learning activities or in the socialized recitation. They can make few contributions that the other members of the class will recognize, and they do not profit much from the contributions of others. A true social situation demands that one respond and be responded to, in social interaction; it demands that one learn a little and teach a little, as on the playground. On the playground a child must participate, be a member, if he is to derive much benefit from group activity; it does little good to look on, as the crippled or the one who is not accepted by the group sometimes must do.

Why do we believe in socialized education in the first place? Why do we not recommend the plan of allowing each child to go at his own pace in seatwork? Clearly, it would take a long time and quite a bit of space to answer these questions fully. Here the discussion will be confined to only one of the kinds of answers involved; namely, the basic needs of children, and for that matter, of people—not all needs, but those suggested by such terms as “recognition,” “success,” “response from others,” and “belonging” to a group of peers. It would seem to be of little value to a pupil to be associated with a group as a physical member if there is little likelihood that the association will be a means of satisfying these needs.

There is the further consideration that these mentally retarded pupils have sufficiently different educational needs in general, or require sufficiently different emphasis, to demand a different

curriculum and a special pattern of educational experiences. It is suggested that these needs can be better met in special classes and with special teachers trained for this work. But it is considered that wherever opportunity permits these pupils will be integrated with normal groups.

It is not anticipated that these needs can be met merely by a reduced schedule, a slower pace, and a paring-down of the regular curriculum to the so-called core subjects of reading, arithmetic, writing, spelling, and the like. In such a program these subjects will not be allotted more time per week than they receive in regular classes. They may be allotted less time, so great is the need for enrichment, character training, social development, personal adjustment, personal hygiene, for self-realization and feelings of self-worth. There will be a great deal of "homework" for the teacher to assist in, not with books so much as with hobbies, recreation, adjustment to family and community life. Many of these children should have work experiences as soon as they are ready for them. More fortunate boys and girls, those from favored homes with family connections, will in the normal course of events obtain the more desirable part-time jobs. The special teacher will need to assist in securing such jobs, and must provide training and assistance in their performance. It is of the greatest importance that these jobs be well done, not so much in order that the child may form the "right habits" as that he may win the praise and commendation of the adults involved and experience the resulting satisfactions. There are many kinds of behavior that the normal child from a normal home picks up more or less incidentally which should be the object of planned instruction by the special teacher.

One of the undesirable consequences of being mentally retarded is that people treat those so afflicted as if they did not have any sense. It seems possible to train mentally retarded children to behave, to act in social situations, in school, and on the job, in such a way that their retardation will not be particularly obvious. Then people will tend to react to them as they react to others; and then they should feel that they are like others.

It must be admitted that at present this is little more than an expression of faith. This is not now being done generally. But our educational efforts for the mentally retarded are pretty much on the shabby side. Nowhere are they comparable to the enlightened practices employed in educating cerebral-palsied or speech-handicapped children, for example.

The feelings the teacher awakens in the mentally retarded pupil about himself, about his teacher, and about his school may be of the greatest value. It is extremely important that the pupil become positively identified with the teacher and with other adults in the community who are in a position to reinforce socially desirable behavior. When positive identification is thus made, these adults are in a position to exert the necessary restraints and controls. This is especially necessary when the home life of the child does not provide adequate stimulation and reinforcement.

Different types of organization have been employed in the education of mentally retarded children. Perhaps we are all acquainted with the opportunity room—of unsavory reputation. One reason this type of program acquired a bad reputation is that its purposes were mixed and ill defined. It has generally been an ungraded room. It was conceived of as a room where a small class of children could receive the individual help they needed. This would appear to be a worthy objective if it is understood that the purpose of the arrangement is to provide remedial instruction to the end that the pupil can soon return to his regular class. It should be regarded as a place for slow learners or educationally retarded children. It is objectionable as a permanent arrangement for the mentally retarded, because, being ungraded, it does not permit effective socialization. It becomes especially objectionable when pupils from both groups are placed in the same room, and intolerable when disciplinary cases are added. When all three types of pupils are placed in an ungraded room, the opportunity room can offer little but custodial care.

In a school system that enrolls less than about 300 elementary pupils the ungraded room for the mentally retarded is about the best that can be done. But its purposes should be clear. It should

not be confused with aims for the educationally retarded, disciplinary cases, the emotionally disturbed, or others. If necessity requires an ungraded room for the mentally retarded, an effort should be made to provide the widest possible opportunities for socialization.

Another questionable type of organization is the special school. Here a building, with its own principal and staff, is set aside for the education of mentally retarded pupils. This arrangement is not a common one. The objection most frequently raised to it is that the pupils are too greatly isolated. Being in a separate building, using a separate playground, they have little opportunity during school hours to become associated with the common run of children. In practice it frequently turns out that the building is an old one that has outlived its usefulness for other purposes. This may add to the child's difficulties of adjusting to his handicap and to his parents' acceptance of it. Attitudes and opinions of the public being what they are, there will almost of necessity be some stigma attached to being assigned to a room, a class, or a building for the mentally retarded. Some feel that the special school aggravates this. The most terrible thing about this is the fact that one who is not accepted by others can rarely accept himself.

What is required is not a way of concealing the fact of mental retardation, but a way of accepting it—accepting it as one of the statistically normal facts of life. A child can attend a school for crippled children without stigma. We think it is a wonderful thing that such schools exist for those who are physically handicapped. The community can take a certain amount of pride in such a school. It may be one of the places to which out-of-town visitors are taken. It is generally a lovely building, staffed by lovely people, and adequately equipped and appointed in every way. The parents and the public are likely to be impressed with the fact that crippled children are receiving the best care and the best education that the school knows how to provide. One wonders what effect similar provisions for the mentally retarded

would have upon the attitudes of parents and the public, and ultimately upon the attitudes of the children toward themselves.

We now see signs of a movement that could have far-reaching effects upon the attitude of the public toward the mentally retarded. Parents of such children are organizing into societies for study and public discussion of their problems. The latter point is especially significant. It should be helpful to learn that many other parents have children similarly handicapped. Frank and open discussion should lead to more complete acceptance of the handicapped child and his condition.

The opinion has already been expressed here that the educational needs of mentally retarded children cannot be met merely by paring the regular curriculum down to a comfortable pace. There will have to be a slower pace, of necessity. But even this adjustment cannot be made merely by applying the scissors to the regular courses of study. For example, a pupil who is old enough to be in the fifth grade but who has only a second-grade reading ability may not find much interest in second-grade reading material.¹⁷ Something of the general interest in the education of mentally retarded and slow-learning pupils, as well as recent developments in the field, can be seen in recent books, notably those of Kirk and Johnson, Ingram, and Smith and Burks.¹⁸ In these books the student will find discussions of objectives, methods, and curricular materials.

It is easy to gain the impression that special education is a

¹⁷ Fortunately there are several sources of material suited to this purpose: S. A. Kirk, *Teaching Reading to Slow-Learning Children* (Boston: Houghton-Mifflin Co., 1940); H. B. Sullivan, *Boston University High Interest and Low Vocabulary Booklist* (Boston: Educational Clinic, Boston University, 1950); M. Keyser Hill, "A Bibliography of Reading Lists for Retarded Readers," revised, *State University of Iowa Extension Bulletin*, College of Education Series, No. 37, 1953; See also *The American Adventure Series*, Wheeler Publishing Co., Chicago, Ill. This series features "high interest level" and "low readability level."

¹⁸ S. A. Kirk and G. O. Johnson, *Educating the Retarded Child* (Boston: Houghton-Mifflin Co., 1951); C. P. Ingram, *Education of the Slow-Learning Child* (New York: Ronald Press Co., 1953); M. F. Smith and A. J. Burks, *Teaching the Slow Learning Child* (New York: Harper and Brothers, 1954).

recent development, but the United States Bureau of Education published a bulletin in 1913 listing 622 titles on this subject 421 of which were in English.¹⁹ It is true, however, that the present-day proportions of the movement belong to the last decade or so.

The trainable mentally handicapped. Thus far we have been considering the educable mentally handicapped. In a rough kind of way this has meant IQs from 50 to 75. The public schools have assumed the responsibility of teaching such children. Of course a great many of them have found their way into institutions, some for reason of poor home conditions. Until very recently the public schools have assumed no responsibility for the education or training of children scoring an IQ below 50. They have not been regarded as educable. Indeed they are not if we have in mind reading, writing, and so on in the traditional sense. Actually, we do not really know the potential of such children, or of the educable mentally retarded for that matter. Recently the writer saw a little lad reputed to score an IQ of 14 carrying on pretty creditably in a school situation, and a group of such (under IQ 25) singing Christmas carols. Heretofore, institutions have been content to provide custodial care for children scoring below 50.

Within the school year 1954-55 four city school systems within eighty miles of Iowa City have established classes for the trainable mentally retarded. The IQ range of this group is set by some between 25 and 50. Interest in this movement is growing rapidly. How realistic it is, in comparison with institutionalization, is yet to be determined. Instruction of trainable children features language development, social behavior, personal hygiene, and so on. Many parents wish to keep such children at home in the parental circle. To this end such training in school is doubtless helpful. Keeping them at home may present some problems in later years.

Institutions for the mentally retarded. Typically, public institutions for the feeble-minded have been pretty dreary places. Some of them at present are showing a gratifying awakening. Most of

¹⁹ A. MacDonald, "Bibliography of Exceptional Children and Their Education," Bulletin 1912, No. 32, Whole no. 506. (Washington: Government Printing Office, 1913).

them in the past have scarcely maintained a program of instruction that a professor would like to take his class to see. A movement is now under way that, with proper support, seems promising. With proper training in late adolescence many of the educable mentally handicapped can return to society and, with some supervision, become self-supporting. This cannot be done if the children are crowded into bare, abject wards, with no opportunity to participate in the normal processes of social living. As the necessary reforms are made and as enlightened teachers are attracted to such institutions there is a good chance that the state institutions can really fill the need of training centers for mentally retarded children from rural and town communities. The practice of encouraging parents to take the children enrolled in such institutions home for the summer vacation and holidays is all to the good.

Feeble-mindedness and Social Class

There appears to be an opinion prevalent among workers in institutions that the majority of trainable children, IQs in the 25 to 50 range approximately, and idiots (idiopathic, mongolian, and so on) come from the upper-and upper-middle classes, and that the educable mentally handicapped and those of the next category above, slow learners, come preponderantly from the lower social classes (lower-lower and upper-lower). The trainable children who have sustained brain damage are also said to come preponderantly from the upper social classes.

It would not be surprising to learn that the majority of educable mentally handicapped and the slow learners come from the two lower classes (upper-lower and lower-lower), because nearly two-thirds of all children come from these two classes. Indeed it should not be surprising to learn that more than two-thirds of the pupils in such classes come from these two classes. It should not surprise us because of the fact that intelligence scores are related to social class. But it would be amazing to learn that the majority of children in the trainable and subtrainable

groups come from the upper classes. Only about 13 per cent of families belong to the two upper classes and the upper-middle class combined, and less than 13 per cent of the births are from these classes. What would seem more likely is that the *proportion* of the trainable mentally handicapped coming from the three upper classes is greater than that of the educably mentally handicapped and slow learners.

The Gifted Child

This section is limited to the intellectually gifted. Needless to say, there are other kinds of giftedness—in music, art, or other specialties. As with the mentally retarded or the slow learner, we know the percentage of children in the general population meeting any definition expressed in intelligence-test scores. There are, of course, degrees of giftedness. It is a relative matter. In practice it should be defined in a given school system in terms of the nature and the objectives of the program for the gifted. In a school system undertaking to provide for the special educational needs of pupils achieving Stanford-Binet or Wechsler IQs of 125 and above, we would expect it to carry a load amounting to 5 or 6 per cent of the student body. Should the cutting point be placed at 130, the expectation would be about 3 per cent. Gifted pupils can be singled out for different purposes. Some organization may become interested in the brightest 1 per cent. This would take us up to a Stanford-Binet IQ of 140. For some purposes this may not be sufficient. For some types of highly specialized intellectual and creative tasks one might think the requirements called for a degree of brightness found only once in a thousand persons, or once in ten thousand. This would take us up to around 150 and 160, respectively.

In any large random sample of pupils we know beforehand the approximate percentage who will score at given IQ levels. But we do not know until the pupils have been tested which ones belong in the various categories. Fortunately, the use of intelligence tests enables us to classify individual pupils. As noted in

Chapter VII, extremely high IQs are considerably less reliable than low ones, and the error of measurement is correspondingly greater.

Thus there are degrees of giftedness. There is no necessity, in enlightened practice, for assuming that all gifted children should be treated alike. Pupils scoring IQs of 125 or 130 are not highly gifted, although they are certainly adequate for most professional and intellectual requirements. Perhaps a pupil in this IQ range who has good physique, good personality, and other favorable nonintellectual qualities will go farther in most professions than one scoring at a much higher IQ level who is seriously lacking in these nonintellectual traits. But there are intellectual tasks that require extreme brilliance; tasks which simply cannot be performed by persons of the more moderate degrees of brightness.

One might suppose that pupils scoring IQs of 125, 130, or even a little higher should be educated among their normal fellows, suitable attention being paid to enrichment. These will be our leaders in the professions, in government, and in business and industry. They will hardly become men of intellectual genius. It could be argued that it is important for them to maintain the kind of daily social contacts with their age peers that are provided by the regular school routine. In school there are, of course, alternate ways of doing things. We must always judge any school practice in the light of alternative practices available.

If the reader has had an opportunity to observe at close range the personnel of a fine symphony orchestra he may have suspected that the performers were not selected for their good looks. It is probably equally certain that they were not selected for their social qualities, or for their understanding of people. Great musical talent is rare. Conductors of orchestras are inclined to take it wherever it can be found. The intellectual genius is hardly to be cast in a role of leadership among men. His is a creative role. It may not always be important for him to know, understand, or even get along well with the common man. There would appear to be no great objection to his progressing in school at an accelerated pace, getting out of college at the age at which others

are just entering. His program should be enriched as well as accelerated. Here it is a question of those who score IQs of 150 and up; one in a thousand or better. The one-in-a-thousand pupil of 10 has a mental age of 15. If he is one in ten thousand (SD 3.72, Stanford-Binet IQ 160) his MA at 10 is 16.0.

Obviously, the genius is not sharply distinguishable from the near-genius. No one could say with much certainty that a given child earning an IQ of 145 is not as promising as another given child who scores 150. In taking a cutting point of 150, for purposes of discussion, we have a group about which there is little room for doubt, even allowing for a reasonable margin of error in measurement.

Assuming that one-fifth of the population is of school age, we would expect to find 100 pupils at the one-in-a-thousand level (IQ 150) and above in a city of 500,000, 20 in a city of 100,000; 2 in a city of 10,000. On the average we should find one such pupil in every 10 villages of populations of 500. The education of the pupil of genius is not a persistent problem in small school systems; but it could be rather tragic to overlook such a pupil—tragic if he should develop attitudes of disinterest and slackness; if he does, brilliance may well go undetected.

The foregoing is not to imply that the highly gifted child requires a great deal of pampering. He may not need pampering nearly so much as his parents or teacher need to pamper him. He too can be spoiled. He has a right to expect interesting and challenging tasks. It does not seem at all necessary for him to learn everything in sight in order to develop his full potential. He should not be pushed into an early precocity in literature, mathematics, or science. If his interests naturally lead him in such a direction there would seem to be no harm in his following them. But like other children, he needs time for play, for fun, and even idleness.

Why has it been suggested that the highly gifted child be allowed to proceed through school at an accelerated pace, perhaps completing sixteen years of schooling in twelve to fourteen years? Actually, for no very compelling reason at all. He can

learn all he needs to learn at the elementary, secondary, and collegiate levels in twelve years or so and will learn far more than the average or moderately superior pupil will in sixteen years. Perhaps the question of time is the most important one. By getting through college and subsequent professional or technical training—if that is to follow—at an early age he can begin his creative work at a correspondingly early period in his life. In all this his own wishes and welfare are paramount. It is not as if he owes a greater debt to society than another person. But it is to society's advantage to provide the opportunities for his development.

One can see some good in bringing highly gifted pupils together in special classes or schools for at least a portion of their education. Perhaps it is possible to do this without neglecting their social development. The private school, for example, which represents first social exclusiveness and to a lesser extent intellectual exclusiveness, seems to leave few, if any, untoward effects.

The discussion here has been chiefly about the highly gifted pupil who by definition is infrequently encountered. The moderately gifted pupil comes along about 2 per class of 30 pupils, on the average—if we number among the gifted those scoring IQs of 125 and above. This would appear to be a practical IQ level from which to start, bearing in mind, of course, that there is a great difference between being the 6th brightest in 100 and the brightest 1 in a 1000.

It is suggested that enrichment provides the best opportunity for the moderately gifted. The qualitative aspects of enrichment are those which count. Little is accomplished by merely increasing the quantity of work. Some acceleration upon the part of some pupils would seem to be permissible when physical and social development and academic achievement warrant. Segregation in special classes need not be an all-or-none matter. Complete segregation of the moderately gifted would seem to be unwise. In the larger school systems it may be altogether desirable to organize special classes, like the Cleveland Public Schools'

"major work" classes for the gifted.²⁰ Perhaps membership in such classes should be more or less optional and some limit be put on the number a given pupil could elect—a limit in practice, if not a hard and fast rule. This is a matter that should be decided in the case of each pupil by his teachers, supervisor, and principal. It would probably be unwise, except for the extremely brilliant pupil, to permit a full course schedule of classes of this kind.

Such a program will require supervision. In the larger cities this presents no problem; there will be enough pupils, classes, and teachers to warrant a supervisor. In the smaller school systems it may be sufficient for one or more teachers to specialize in this work and to act in an advisory capacity as a part-time activity. Some have advised the employment of county supervisors to work with teachers in rural and village schools. There are the problems of detecting the gifted, of making decisions about their programs, and helping teachers with enrichment practices, deciding on extra promotions and the like, that may prove to be more difficult for the rural and small-town teacher than for the teacher in a larger system.

In 1921 Professor Terman and his colleagues at Stanford University began an investigation of gifted children that was destined to have far-reaching effects.²¹ By the end of 1922 the group numbered 1528, about 70 per cent of whom were of pre-high-school age—average age of 9.7 years. The others were high-school pupils, with a mean age of 15.2 years. The minimum Stanford-Binet IQ in the pre-high-school group was 140, the mean of the group being 151. The high-school group was tested by the Terman Group Test. The minimum IQ for inclusion in this group was 135, the mean being 142. Because of certain differences in the two tests, the authors judged the two groups to be equally bright.

²⁰ M. R. Sumption, D. Norris, and L. M. Terman, "Special Education for the Gifted Child," in *Education of Exceptional Children*. National Society for the Study of Education, *Forty-Ninth Yearbook* (1950), Part II.

²¹ L. M. Terman, et al., *Genetic Studies of Genius: Mental and Physical Traits of a Thousand Gifted Children*, Vol. I (Stanford, Calif.: Stanford University Press, 1925).

The aim of this investigation was to gather information about highly gifted children. It was not limited to their education. Accordingly, the members of the group were studied in a variety of ways. Information was gathered regarding size and general physical fitness, educational attainments, previous educational experiences, interests, character traits, emotional stability. The investigators concluded that the deviations of gifted children from children in the general population were in the upward direction in nearly all traits, though the amount of upward deviation was "greatest in those aspects of behavior most related to intelligence: originality, intellectual interests, and ability to score high in achievement tests."²² These findings have been confirmed and re-emphasized by a number of workers in this field.²³ Terman and Oden reported that the interests of gifted children are like those of children who are older than themselves.

Some exercise of restraint in the education of the gifted is as much to be desired as the avoidance of neglect. A child becomes gifted through no very special effort of his own or of his parents. Intensive intellectual nourishing upon the part of his parents does not appear to be necessary for the full realization of his potential, and indeed may be of questionable value. We may also assume that an intensive program of studies in school is not essential to his becoming an intellectually gifted adult. There probably is no way within practicable educational limits to prevent his doing so. Although he may more or less automatically grow up to be an intellectually gifted adult, his becoming a highly successful, well-adjusted citizen is not automatic. While his chances of doing so are far greater than those of the average pupil, he may not distinguish himself at all. By 1945, 70 per cent of the men and 67 per cent of the women of the original group

²² L. M. Terman and M. H. Oden, in *The Gifted Child*, ed. by P. Witty (Boston: D. C. Heath and Co., 1951), p. 25.

²³ L. S. Hollingworth, *Gifted Children: Their Nature and Nurture* (New York: The Macmillan Company, 1929); M. R. Sumption, *Three Hundred Gifted Children* (Yonkers: World Book Co., 1941); L. M. Terman and M. H. Oden, *The Gifted Child Grows Up* (Stanford, Calif.: Stanford University Press, 1947).

of gifted children (examined 1921-23) in the Stanford study had graduated from college. Of those graduating, about 80 per cent earned average grades of B or better; about 30 per cent graduated with honors. About 90 per cent of the men and 86 per cent of the women entered college. Some earned average or below-average grades; 8 per cent of the men and 2 per cent of the women "flunked out."

From the life histories of the men a group of psychologists selected the most successful 20 per cent and the least successful 20 per cent, all of whom were at this time 25 years of age or older. Of the most successful group, 90 per cent had graduated from college; 76 per cent had completed one or more years of graduate study; 70 per cent were employed in the professions. Of the least successful group, 37 per cent graduated from college; 15 per cent had completed one or more years of graduate study; 9 per cent were employed in the professions. The most successful group began to pull away from the least successful one in academic achievement in high school, and excelled by a wide margin in college. The members of the most successful group surpassed those in the least successful group as to the 1921-23 childhood data on all traits except intelligence and physical health. As adults, they seemed better adjusted emotionally and socially. Even among the greatly gifted, all-round development is highly desirable.

A few final suggestions on the education of the gifted. There should be provided interesting, stimulating, and challenging learning experiences. This, as has already been said, is not accomplished by requiring "more." More work, if it does not meet these conditions, may be worse than "less." Having provided interesting, stimulating, and challenging tasks, it is wrong to overdo the intellectual side of their development. They should not be pushed unduly. In fact if their own interests incline them too much to books, to the neglect of other things, it may be found expedient to apply some restraint. Of course it would be a matter for concern if the gifted child does not develop an interest in books and does not engage in reading books on a wide variety

of subjects, although no one need be disturbed if some of them are of little value.

Terman and Oden have emphasized the importance for the gifted child of play with children not too far from his own age, of hobbies and collections, of work experiences and definite responsibilities at home, of contact with reality and interest in the ordinary affairs of the home and the community, and of his being expected at school to do the best work he is capable of rather than that which is satisfactory in terms of the rest of the class.²⁴

Acceleration. As was stated in the preceding chapter, a study of the records of a 15 per cent sample of schools in Iowa failed to reveal a single student among those currently enrolled in the seventh grade who had skipped a grade. While this may not be representative of the situation in the nation, it is true that acceleration has not been a common school practice during the last two or three decades. There is no doubt that at least 2 or 3 per cent of our students can skip one or two grades without detriment to their scholastic achievement. A 10-year-old pupil of this level of brightness scores a *mental age* of about 13. After he has skipped a grade he is still far above average for his class, and still stands to make among the highest marks in his class. But how does he compare with other equally bright pupils who follow the regular program? The evidence is not abundant, but suggests that in subsequent grades he does as well or better as his matched companions who are not awarded extra promotions. As will be seen in Chapter XI, about 10 per cent of the pupils in a given elementary grade equal or exceed the median achievement of the pupils two grades above, at any given time.

Evidently, 2 or 3 per cent of American students could easily skip a grade in the elementary school and perhaps one in high

²⁴ The reader who is interested in a review of typical programs of education for the gifted is referred to P. Witty, "Nature and Extent of Educational Provisions," in *The Gifted Child*, already cited; A. O. Heck, *The Education of Exceptional Children* (Ed. 2; New York: McGraw-Hill Book Co., 1953); H. J. Baker, *Introduction to Exceptional Children* (Rev. ed.; New York: The Macmillan Company, 1953).

school, although the latter might be more difficult to manage on account of school transcript problems. Inasmuch as the majority of gifted students go to college, it might be managed by allowing them to enter college after spending only two or three years in high school. Several colleges and universities are experimenting with this plan at present.

What are the advantages and disadvantages in such an arrangement? As already suggested, the principal advantage lies in getting the gifted into productive careers at an earlier age. In many fields the tendency is to appoint young men and women to responsible positions. Moreover, there is evidence to the effect that the younger years in an adult's life are the most productive ones. The accompanying figure, adapted by Pressy from Lehman's work, shows this for certain fields.²⁵

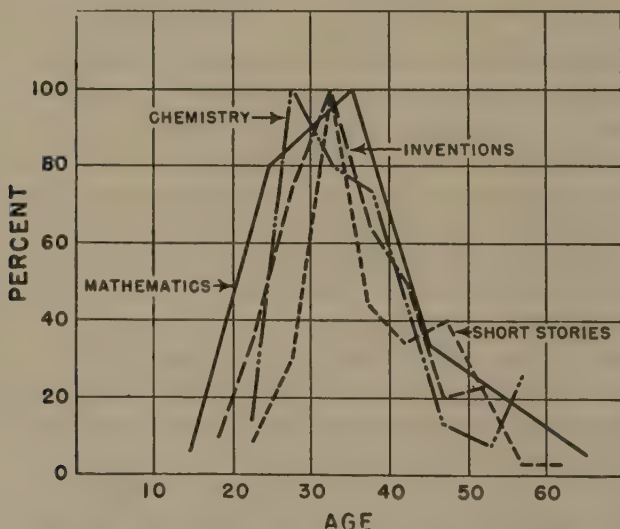


Fig. 11. Age of most notable single accomplishment of famous men

²⁵ H. C. Lehman, "Man's Most Creative Years," *Scientific Monthly*, 69 (1944), pp. 387-91; S. L. Pressy, *Educational Acceleration, Appraisal and Basic Problems* (Columbus: Ohio State University, 1949), p. 33. Reproduced by courtesy of the Bureau of Educational Research.

If there is no doubt about the gifted student's ability to take his schooling at a faster pace, what are the objections? Why are not plans that allow him to do this generally in force? The prevailing attitude has been that such a practice is provocative of social and emotional maladjustments as a consequence of the pupil's being thrown with pupils older than himself. If this does not happen immediately, it may do so later—in college, for example—so the argument runs. This viewpoint has persisted and prevailed generally despite the fact that there has never been any evidence that the younger members of a class are less well adjusted than those of normal age. One suspects that there is in these United States a kind of implicit notion that it does not pay to be too different.

In the Stanford study it was possible to divide the gifted into two groups, one accelerated (finishing high school before 16-6), the other nonaccelerated, finishing after 16-6. As children and as adults the two groups were not different in intelligence. They were alike in elementary-school achievement, but in high school the accelerated group began to pull away. More of this group attended college and a higher percentage graduated with honors. The two groups also appeared to be alike in social development both in childhood and in adult life. The accelerated participated in slightly fewer activities in college, though both groups participated in more activities than college students in general.

Coombs has reported some early results of a very interesting investigation now still under way.²⁶ At the time of the report about 1000 carefully selected students were admitted to 12 participating colleges and universities either one or two years before high-school graduation. At the end of the first two years of college work they have been compared with their classmates in general and with a matched group of like aptitude who entered college after completing the full high-school program. The accelerated, as one might suppose, outperformed their classmates in general.

²⁶ P. H. Coombs, "Lessons from Recent Experiments in Articulation and Acceleration," *Proceedings of the Ninth Annual Conference on Higher Education*, Washington, D. C., 1954, pp. 271-75.

They also showed a slight superiority over their comparison group. They appeared to be equally well adjusted and tended to rate their college experiences more favorably.

It is just possible that any disadvantages, from the standpoint of mental hygiene, associated with the gifted student's being thrown with older students may be compensated for by the satisfactions connected with more interesting and challenging school experiences. Let us close with an observation made earlier—that the interests of gifted children tend to conform to those of children older than themselves.

ADDITIONAL REFERENCES

- Bedoian, V. H., "Mental Health Analysis of Socially Over-accepted, Socially Under-accepted, Overage and Underage Pupils in the Sixth Grade," *Journal of Educational Psychology*, 44 (1953), 366-71
- Burt, C. L., *The Causes and Treatment of Backwardness* (New York: Philosophical Library, 1953)
- California State Department of Education, *Mentally Retarded Students in California Secondary Schools*, Bulletin 22 (1953)
- Chamberlain, N. H., and Moss, D. H., *The Three "R's" for the Retarded: A Program of Training the Retarded Child at Home* (New York: National Association for Retarded Children, 1953)
- Courville, C. B., *Cerebral Palsy: A Brief Introduction to Its History, Etiology and Pathology* (Los Angeles: San Lucas Press, 1954)
- Dohan, M. H., "The Accelerated Elementary Program at Ursuline Academy, New Orleans." *Catholic Educational Review*, 46 (1948), 431-35
- "The Education of Exceptional Children," *Review of Educational Research*, 1953, 23 (1953), No. 5
- Garrison, K. C., *The Psychology of Exceptional Children* (New York: Ronald Press Co., 1950)
- Hinkelman, E. A., "Intellectual Level and Personality Adjustment," *Elementary School Journal*, 52 (1951), 31-35
- Hunter, R. A., and Morgan, D. H., "Problems of College Students," *Journal of Educational Psychology*, 40 (1949), 79-92
- Jacob, W., *New Hope for the Retarded Child* (New York: Public Affairs Committee, 1954)

- Johnson, W., Brown, S. F., Curtis, J. F., Edney, C. W., and Keaster, J., *Speech Handicapped School Children* (2d ed. rev., New York: Harper and Brothers, 1956)
- Lloyd, F., *Educating the Subnormal Child* (London: Methuen, 1953)
- Metropolitan School Study Council, Subcommittee on the Slow Learner, *Slow Learner in the Average Classroom* (New York: Metropolitan School Study Council, 1954)
- Pressey, S. L., "That Most Misunderstood Concept—Acceleration," *School and Society*, 79 (1954), 59-60
- Report on Study Projects for Trainable Mentally Handicapped (Springfield, Ill.: State Department of Public Instruction, 1954)
- Sarason, S. B., *Psychological Problems in Mental Deficiency* (Ed. 2, New York: Harper and Brothers, 1953)
- "Speech and Hearing Problems in the Secondary School," *Bulletin of the National Association of Secondary-School Principals*, 34 (1950), 131
- Statistics of Special Education for Exceptional Children, 1952-53*, Biennial Survey of Education, 1952-54, Chap. 5
- U. S. Children's Bureau, *The Child with Epilepsy* (Washington, D.C.: Government Printing Office, 1953), Folder 35
- , *The Preschool Child Who Is Blind. Ibid.*, Folder No. 3
- U. S. Office of Education, *State Certification Requirements For Teachers of Exceptional Children*, Bulletin No. 1, 1954
- , *Teaching Slow and Rapid Learners in High Schools*, Bulletin No. 5, 1954
- , Department of Health, Education, and Welfare, *College and University Programs for the Preparation of Teachers of Exceptional Children*, Bulletin No. 13, 1954
- Wallin, J. E. W., *Education of Mentally Retarded Children* (New York: Harper and Brothers, 1955)

APPROACHES TO THE PSYCHOLOGY OF LEARNING

THIS CHAPTER WILL BE CONCERNED chiefly with two general approaches. One may be called the associationistic approach. Historically, several schools or systems of psychology have used the associationistic frame of reference. The leading schools have been *structuralism*, *functionalism*, and *behaviorism*. The issues that once separated these schools have either been resolved or are not now conceived to be important, though actually psychology as represented by this group has become largely behavioristic. The other approach is known as *field psychology*. Initially, there was a tendency for field psychology to break up into separate schools. Not a great deal came of this. At least the original school, *gestalt psychology*, has been and is the dominant one in this movement.

Of these two approaches the associationistic one has by far the longer history and, in the United States at least, much the larger number of adherents. In this chapter it will receive the greater proportion of space. It is to be observed that the relative success of schools of thought, such as are represented here, may depend not only upon the inherent soundness of the positions but also upon historical timing and the vigor and ability of the men associated with them.

Associationistic Psychology

Associationistic thought had its origin in philosophy. Actually, three of the laws of association date back to Aristotle. These—*contiguity*, *similarity*, and *contrast*—have been known as the primary laws of association, as opposed to subsequently derived laws known as secondary. This distinction does not have much force today except when used in a temporal sense.

As originally conceived, the laws of association applied chiefly to thought—specifically to mental succession. Thus they purported to state the conditions under which mental event A arouses mental event B associatively; or the conditions governing the probability that a given A will arouse a given B. Thus Hartley (1704-1757), the English philosopher, must have had this issue in mind when he addressed himself to the question, What are associated?

Hartley recognized two kinds of experience, *sensation* and *ideation*, and possibly a third, *feeling*. Sensations, he averred, are produced by certain vibrations set up in the nerves, the spinal cord, and the brain as a terminal result of the action of external objects upon the sense organs. These vibrations leave certain vestiges of themselves in nerve substance, with the condition that they may be repeated without a repetition of the sensation. The re-enactment of these vibrations by other than the original exciting agent produces ideas of sensation. Further, "any sensations, A, B, C . . . by being associated with one another a sufficient number of times, get such a power over the corresponding ideas a, b, c . . . that any one of the sensations, A, when impressed alone, shall be able to excite in the mind b, c . . . the ideas of the rest."¹ A sensation can by association thus instigate an idea but not another sensation, the latter always being dependent upon the excitation of sense organs; however, an idea can associatively instigate another idea. If a number of ideas have habitually occurred together, one may serve to instigate the others.

¹ H. C. Warren, *A History of Association Psychology* (New York: Charles Scribner's Sons, 1921), p. 53.

Both sensations and ideas may instigate movement associatively; and movement may in turn instigate ideas and other movement. Thus the "sixth sense" (the sense of muscular movement) became for Hartley a logical necessity—if movement is to be an instigator, although, he did not, and did not need to, take this step, one that was taken nearly a hundred years later by Sir Charles Bell.

Thus for Hartley the instigators are sensations, ideas, and movement, although the latter reduces to sensation; and the associatively instigated are ideas, movement, and possibly feeling. With respect to feeling Hartley is not very explicit, although he did attempt to encompass it in his system.

Robinson in his modern appraisal of association in the light of intervening history again raised the question, What are associated? ² As associative instigators he accepted *sensory, perceptual, affective, and ideational* processes; and *ideas, feelings, movement, and general sets*, as associatively instigated. It is interesting to note that Robinson's exposition of the prevailing modern view is not seriously at variance with Hartley's conception formulated nearly two hundred years earlier. While a modern writer might avoid such an expression as "Sensations are produced by certain vibrations set up in the nerves" . . . he would be unable to say exactly how they are produced.

An idea, which by definition is a symbolical reaction, is always a secondary event. It is not instigated, as is sensation, by the action of physical forces upon sense organs. It is instigated by some prior mental event, a sensation or another idea. At the psychological level we say that one mental event instigates another by virtue of certain conditions determining the associative strength between the two mental events. Laws of association are statements of these conditions. Again, at the psychological level we say associative connections are formed between *mental events*—not between hen and egg, but between one mental event, *hen*, and another, *egg*. We assume that physiological events, probably

² E. S. Robinson, *Association Theory Today* (New York: D. Appleton-Century Co., 1932), pp. 39-48.

neuromuscular events, are at the bottom of the whole affair. We certainly would like to know the nature of these physiological events, but knowledge of them is not necessary to the treatment of associative phenomena at the psychological level.

When Locke (1632-1704) won the argument over innate ideas, when scholars came to accept the thesis that there are no innate ideas, it became obvious that there are no innate associative connections between ideas or between sensory events and ideas. Hence if ideas are learned reactions and if the associative connections between them and other mental events are learned, the laws of association become also laws of learning. In Hartley's day learning had not emerged as a subject of investigation. Learning did emerge as a major branch of psychology during the latter half of the nineteenth century. Almost immediately laws of association were reformulated as laws of learning. In traditional American psychology *learning* has been all but synonymous with "forming associations," *remembering*, with the functional strength of associative connections, *recall*, with the operation of association. At an explanatory level learning has sometimes been defined as the forming of new associative connections between stimuli (stimulations) and responses or the strengthening or weakening of old ones, as a consequence of practice; and forgetting as the weakening of associative connections.

The word "between," generally employed in discussing associative phenomena, is likely to suggest undue simplicity. Mental events are often highly complex. "Among" may in most situations be more realistic than "between." Because of our deep-rooted tendency to think of associative connections as being "between," it is often preferable to use words like "organization" or "assimilation" when speaking of complex learning or thought phenomena. In logical, meaningful learning it is the perceiving of relationships that counts. This is a much more complex thing than the assumed associative connection between *hen* and *egg*; but it need not be any less an associative phenomenon.

Brown's laws. Thomas Brown (1778-1820) formulated nine laws, stated nine conditions, in terms of which associative

strength varies. These have generally been referred to either as relative laws or as secondary laws. Brown recognized that many conditions besides contiguity, similarity, and contrast (Aristotle's laws) influence associative strength. His designations are as follows: relative *duration*, relative *liveliness* (feelings of, relative to the parts associated), relative *frequency*, relative *recency*, relative *freedom from alternative associates*, *constitutional differences*, *varying emotion of the hour*, and *prior habits of life and thought*. A little later this text will raise the question of the conditions essential to learning (or by inference, to the formation of associative connections), conditions in the absence of which learning does not take place. Implicit in Brown's formulation is the fact that associative potency—that is, the probability that a given A will instigate a given B—varies with a variety of determining conditions.

Association today. Of Aristotle's three laws the status of contiguity and similarity seem assured in the psychology of learning, at least for the foreseeable future. The law of contrast has found no very secure place in general psychology.

The law of contiguity has been stated by Robinson as follows: *The fact that two psychological processes occur together in time or in immediate succession increases the probability that an associative connection between them will develop—that one process will become the associative instigator of the other.* It should be noted that neither simultaneity nor immediate succession is an essential condition, although the closer the approximation to these conditions, the greater is the chance that an associative connection will be formed.

✎ The law of similarity requires little comment for the present, except to say that there are several kinds or dimensions of similarity—similarity in form or appearance, in meaning, in use and purpose, and so on. Degree of contiguity and of similarity have been varied systematically in a great number of psychological experiments. The lawful effects of such variation are now well known.

A significant extension of the classical law of similarity is found in the law of assimilation, which has been stated as follows:

To any new situation man responds as he would to some situation like it, or like some element of it. In default of any bonds with it itself, bonds that he has acquired with situations resembling it, act.³ Thus the law of assimilation also states one of the conditions of the use of learning.

*Any novel sense impression will tend to elicit those responses that are already connected with a similar sensory stimulus.*⁴

The laws of association must state (1), the conditions that must be met for associative connections to be formed at all, and (2), the conditions in terms of which associative strength varies. Association as association occupies a relatively minor position in psychology today. In traditional American psychology association has become an integral part of the subject of learning.

Of the laws mentioned thus far contiguity is regarded as essential to association forming and/or learning. *Effect*, which may be implicit in Brown's relative *liveliness*, is now regarded by many associationistic psychologists as an essential condition to association forming. In subsequent writing, notably that of Thorndike and Hull, the importance of *effect* has been greatly expanded, and to an extent redefined. Brown appears to have thought of this condition as influencing associative strength but not as essential to the formation of associative connections.

Frequency, degree of contiguity, duration, liveliness, absence of alternative associates, constitutional differences, and prior habits of life are generalized statements of conditions that govern the variable strength of associative connections—all of which have been verified by a half century of experimentation. Brown's *varying emotion of the hour* and *temporary diversity of state* may be reduced to a single formulation, as in Carr's *law of variable subjective condition*.⁵ *Absence of alternative associates* finds

³ E. L. Thorndike, *Educational Psychology* (2 vols.; New York: Teachers College, Columbia University, 1931), Vol. 2, p. 28.

⁴ H. A. Carr, "The Laws of Association," *Psychological Review*, 38 (1931), 212-28.

⁵ *Ibid.*

expression in the Mueller-Schumann law of associative inhibition (which see); *prior habits of life* is implicated in all of the literature on transfer of training; and *constitutional differences* is verified in the work on the relationship between intelligence and learning and in much of the work on physiological psychology. The two laws last named have found modern expression (by Robinson) in the *law of acquaintance* and the *law of individual differences*, respectively. Liveliness has meant attention-getting value and effect. The latter is probably closer to Brown's usage. Recency is a logical deduction from the Ebbinghaus curve and the bulk of work on the temporal rate of forgetting.

The number of laws of association could be considerably extended upon the basis of existing experimental data, if it were deemed useful to do so. The number could be made equal to the number of demonstrable conditions of learning and forgetting.

Perhaps most educational psychologists would agree that E. L. Thorndike has been the most eminent man in their profession. He contributed to nearly every phase of the subject, but the concern here is with learning theory. In 1898 he contributed a monumental monograph on animal intelligence.⁶ In this and in a subsequent book by that title, in his three-volume work on educational psychology, and in the later years of his work, culminating in his *Human Learning* and *The Fundamentals of Learning*, he evidenced a keen interest in the theoretical aspects of learning.⁷ Perhaps no one, unless it was Hull, made a more significant contribution to its development. The most significant of Thorndike's writing on laws of learning pertains to *exercise*, *effect*, and *belonging*.

⁶ E. L. Thorndike, "Animal Intelligence: An Experimental Study of the Associative Processes in Animals," *Psychological Review*, Monograph Supplement, Vol. 2 (1898), No. 8.

⁷ E. L. Thorndike, *Animal Intelligence* (New York: The Macmillan Company, 1911); *Educational Psychology* (I, *The Original Nature of Man*; II, *The Psychology of Learning*; and III, *Mental Work and Fatigue, Their Individual Differences and Their Causes* (3 vols.; New York: Teachers College, Columbia University, 1913); *Human Learning* (New York: The Century Co., 1931); *The Fundamentals of Learning* (New York: Teachers College, Columbia University, 1932).

The *laws of exercise* are empirical laws. They do not now have any theoretical importance. They simply state observable relationships between practice, or lack of practice, and performance. Originally Thorndike apparently conceived them to have explanatory value, but in his later writings he departed from this idea. They were stated in 1913 as follows: "*When a modifiable connection is made between a situation and a response, that connection's strength is, other things being equal, increased. . . . When a modifiable connection is not made between a situation and a response during a length of time, that connection's strength is decreased.*"⁸

All educators know that learning requires practice, and that the attainment of a high degree of perfection, especially in a complex skill, requires a great deal of practice. They also know that during long periods of no practice performance deteriorates. The lawful relationships between practice (trials or repetitions) and learning and between lack of practice and forgetting have been determined in experimental work for a great variety of situations. However, as just stated, Thorndike came to the position in his later work that exercise, qua exercise, does little or nothing to improve the strength of a connection. This position and the experimental work upon which it was based are presented in *The Fundamentals of Learning* (1932). He came to the conclusion that mere repetition, repetition without other conditions of learning, notably *effect* and *belonging*, does not lead to learning but maintains the status quo. This should be obvious from a common-sense point of view. A typist, a linotype operator, a telegrapher, or even a teacher, may ply his trade for years without noticeable improvement. It is not mere repetition, but repetition of the conditions of learning, that ensures learning. There can be repetition without these conditions.

About the time Thorndike's *The Fundamentals of Learning* appeared, several investigators, notably McGeoch, had taken a similar position with respect to *disuse*, the second of the two laws of exercise. Disuse as formulated by Thorndike is a state-

⁸ Thorndike, *Educational Psychology*, Vol. 2, pp. 2 and 4.

ment of the lawful relationship between forgetting and elapsed time. This relationship is an established fact. Some interval of time is a necessary condition of the normal processes of forgetting; and the amount of forgetting is positively correlated with the length of elapsed time. But time, qua time, does nothing. Growth, decline, erosion, decay, forgetting—in fact most natural processes—require time, but time does not bring these things about.

The empirical law of disuse does not stand or fall upon any particular theory of causation. There has been a theory that envisages forgetting as a result of deterioration or fading of neurological connections or impressions as a function of disuse—perhaps as a result of metabolic change. This theory does not now command much attention.

The *law of effect* was stated by Thorndike in connection with his earlier work on associative processes in animals. The following statement is taken from his *Educational Psychology* (1913): *When a modifiable connection between a situation and a response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased: When made and accompanied or followed by an annoying state of affairs, its strength is decreased.*⁹ There is an immense literature on this subject. The reader who is interested in following it is referred to works by McGeoch and Irion and by Hilgard.¹⁰

The law of effect has been of tremendous theoretical importance in psychology. Indeed it and its lineal descendant, the principle *reinforcement*, represent one of the principal lines of cleavage today between associationistic psychology and field psychology, as will be seen presently. In its early history, and for that matter pretty well down to the early 1930s, *effect* for the most part meant *affect*. Locke had stated in 1690: "Attention and repetition help much to the fixing [of] any ideas in the memory;

⁹ *Op. cit.*, Vol 2, p. 4.

¹⁰ J. A. McGeoch and A. L. Irion, *The Psychology of Human Learning* (New York: Longmans, Green and Co., 1952); E. R. Hilgard, *Theories of Learning* (New York: Appleton-Century-Crofts, 1948).

but those which naturally at first make the deepest and most lasting impression are those which are accompanied with pleasure and pain."¹¹ It seems likely that *affect* loomed large in Thorndike's earlier thinking about the law of *effect*.

Two important changes have occurred respecting effect since Thorndike's 1913 formulation. Then effect was conceived to operate bidirectionally. Pleasure and pain, satisfiers and annoyers, were regarded as having opposite effects. This is clearly different from Locke. During the later years of his research Thorndike departed from the idea that satisfying and annoying states of affairs have the opposite effects of "stamping in" and "stamping out." Rather, both "stamp in." This is the present-day conception. Both reward and punishment are now conceived to act as rewards. In the case of punishment, avoidance reactions by which one escapes anticipated punishment are conceived to have rewarding (reinforcing) consequences. In the second place, effect is less closely tied to affect. Today it has no more association with affect than that implied in the "satisfaction of motivating conditions." Thus McGeoch stated that effect means what happens as a consequence of an act, usually within a few seconds afterward. "*Other things being equal, acts leading to consequences which satisfy a motivating condition are selected and strengthened, while those leading to consequences which do not satisfy a motivating condition are eliminated.*"¹² As a matter of fact, the term "effect" has been largely replaced by such terms as *reinforcement* and *reward*.

Thus the efficacy of effect is not attributed directly to pleasurable after-effects, as such, at least not to sensuous ones, but rather to a "confirming reaction," a sort of "biological reinforcement," or tension reduction.

¹¹ J. E. Russell, *The Philosophy of Locke: Extracts from The Essay Concerning Human Understanding* (New York: Henry Holt and Co., 1891), p. 53.

¹² J. A. McGeoch, *The Psychology of Human Learning; An Introduction* (New York: Longmans, Green and Co., 1942), p. 574. See also H. A. Carr, *Psychology* (New York: Longmans, Green and Co., 1925), pp. 93ff.

The confirming reaction seems . . . to issue from some want or "drive" or purpose of the organism. The larger pattern of goals and strivings of the individual determine what results shall be experienced as satisfiers, as fitting and good in that situation and what confirming reaction shall be elicited.¹³

The effectiveness of a consequence as a reinforcing factor is said to vary with the degree to which the consequences is observed to "belong" to the act that led to the consequence.

According to this conception, what one learns is a response. Thus far it has been implied that a response to be learned must be made, keeping in mind that it may be made symbolically. It not only must be made but also be reinforced, rewarded; it must satisfy some kind of motivating condition. *How the situation and the response are perceived* makes a great deal of difference. If the situation can be properly analyzed and as a consequence can be perceived to call for a particular response, learning is facilitated tremendously. This is called meaningful or insightful learning. Thorndike expressed it as the *law of belonging*.

While *belonging* is not a basic law in the sense that contiguity and effect are—that is, not basic in the sense of being necessary to all learning whatsoever—it is basic to most of the learning that we think of as being educational.

A student could be taught to go through the steps in computing the square root of a given number with little aid of understanding. But understanding makes the difference between the tedium of rote learning and the swift, orderly progress of logical learning and, in this instance, the difference between useful and useless learning. Understanding (meaning, insight) tends to ensure the making of the right response quickly, and to ensure the making of it again and again in similar situations, and to ensure reinforcement as a consequence of satisfaction of the motivating conditions. One of the things achieved by insight is a reduction in

¹³ A. I. Gates, "Connectionism: Present Concepts and Interpretations," in *The Psychology of Learning*, National Society for the Study of Education, *Forty-First Yearbook* (Bloomington, Ill.: Public School Publishing Co., 1942), Part II, Chap. IV.

“monkeying around” in search of the right response, although insight itself frequently calls for some “monkeying around.”

The *law of belonging*, set forth by Thorndike in 1931, affords a working basis for the study of the conditions of understanding.¹⁴ Belonging may be thought of as the seeing of relationship; the noting that this goes with that, follows from, is caused by, or belongs with that. When such relationships are perceived, effect-producing behavior follows and learning takes place quickly. That is, adequate understanding leads immediately to behavior that satisfies the motivating conditions, resulting in effect (reinforcement, confirming response, tension reduction), the *sine qua non* of learning. But the timesaving factor is not the most important feature of this kind of learning. More important is the fact that insight leads to generalization and better retention.

Comments on the Role of Practice

If it is correct to assume that in order to learn a response the learner must make that response, practice, at least to the extent of one trial, is necessary to learning. While practice is a necessary condition, it is not a sufficient one. Mere repetition of an act does not lead to improvement in the function practiced. This is obvious from the manifest fact that an enormous amount of practice can fail to produce improvement. In fact practice may lead to deterioration of the function practiced. It is the practice of the conditions of learning that counts. Thorndike stated this fact clearly as early as 1913:

The law of habit is supposed to be that “practice makes perfect”; or that the nervous system “grows to the modes in which it is exercised.” But practice without zeal—with equal comfort at success and failure—does *not* make perfect. . . . When the law of effect is omitted—when habit-formation is reduced to the supposed effect of mere repetition—two results are almost certain. By the resulting theory little in human behavior can be explained by the law of habit; and by the

¹⁴ *Human Learning*.

resulting practice, unproductive and extremely wasteful forms of drill are encouraged.¹⁵

Meumann's well-known treatment of *the will to learn* is to the same purpose. "We profit from continued practice only in proportion as we incite the will to progress and arouse an intention to improve."¹⁶ There must be motivation to practice, else one would not practice. But motivation to practice is not the same thing as motivation to improve performance in the function practiced. Motivation plays more than a single role. It initiates practice. It defines the problem and the solution. It sets the conditions for reinforcement. The reinforcing or rewarding element is the satisfaction of the motivating conditions. All of this is in keeping with the traditional approach to the psychology of learning. As will be seen presently, there are other approaches.

We are all well aware of the fact that mastery of a learning situation sometimes requires a great deal of practice. There are several reasons for this. In some cases we must master some elements in a situation before proceeding to others. In situations susceptible of insight the insight may not be immediately gained, the initial insight may be only partial, or may actually be erroneous or must be tested. Inhibition to distractions and competing responses may have to be built up. Frequently several responses may be associated, in varying degrees of potency, with a situation. One of the functions of practice is to raise the hierarchical position of the desired response in virtue of repeated reinforced trials and the corresponding weakening of the competing responses by virtue of their not being reinforced.

When we speak of repetitions or trials in learning situations, or practices, or whatever is appropriate to a particular learning situation, we should not assume that the learner responds the same way each time. If he does, we may assume he will not make any progress. Such a situation could only maintain the status quo.

¹⁵ *Educational Psychology*, Vol. 2, p. 22. Quoted by courtesy of E. L. Thorndike.

¹⁶ E. Meumann, *Psychology of Learning* (New York: D. Appleton and Co., 1913), pp. 360-61.

Practice on any complex process results in improvement only if on successive trials the learner varies his performance. The intelligent learner observes the consequences of his acts. Those which are perceived to *belong*, to satisfy the motivating conditions, are reinforced and, as a consequence, learned. We may talk of frequency only in terms of repetition of a total situation. Only the end result is more or less constant. As Angell remarked nearly fifty years ago, only the functions of acts are stable. In a maze, on successive trials, the rat gets to the same food box, or runs the same maze, but neither is accomplished on successive runs by identically the same motor movements. Indeed, once he has learned to "run" the maze correctly he can "swim" it or "walk" or "crawl" it. The behavior of a rat makes sense; so does that of a man, when we can fathom it.

Incidental learning. This term has two meanings in education and still a different meaning in psychology. In the psychologist's use of the term, incidental learning is notoriously ineffectual. In at least one of the educational usages, such learning stands as our best model of educational efficiency; and by the other usage it is certainly not ineffectual. It should be observed, therefore, although it is hardly necessary to point to the moral, that in discussing the pro and con of incidental learning it is imperative that the sense in which it is being used be specified. Incidental learning or teaching, as an educational practice, is not to be condemned by the psychologist's finding that incidental learning is ineffectual.

As the psychologist uses the term, incidental learning is roughly synonymous with accidental learning. It is assumed that no item is learned unless it be reacted to and reinforced. According to this conception a subject is "set" at least to some slight degree, or otherwise motivated, however slightly, to "react to" when learning occurs. Incidental learning is learning that takes place without instruction or experimentally induced incentive, and without any self-initiated, predetermined motive. Essentially, it is fortuitous learning, though to be sure a person's bent, as determined by his habits of life and his prevailing state of mind,

are influencing factors. It is pretty largely a matter of chance what one reacts to in the absence of specific instructions or self-determination. This is the psychologist's usage of the term. In the laboratory a subject does incidental learning if he learns something of the fabrication of the apparatus, the furnishings of the room, or the habiliments of the experimenter, or other items to the learning of which he is not directed by the conditions of the experiment.

In education the terms *incidental learning* and *incidental teaching* are currently used to designate a particular method of organizing a course of study. For example, in one school system there may be found at certain grade levels a formally organized course in language; in another system the teaching of language at this grade level may be made *incidental* to some other course of study. This is incidental learning in a sense; and this usage of the term is, of course, legitimate, but it really has no parallel in psychological experimentation. The teacher who gets good results with this method of teaching language does not leave the learning to chance, but makes very careful provision for it, both in the organization of the lessons and in the motivation of the pupils.

Knowledge of the ineffectiveness of incidental learning, if it is really incidental, is of the greatest consequence in education. The reading of classical literature may lead to improvement in English usage—and it may not. There is the expectation that it will do so if there exists on the part of the pupil what may be roughly called “language consciousness,” if he is interested in improving his own language, or reacts to good language as good language, or reacts to certain elements as correct and worthy of imitation. That is to say, there must be a *confirming reaction*—without which the reading of good writing does no more to improve language usage than the writing of themes does to improve handwriting.

There is a third field of learning to which the term “incidental” applies; namely, the interlearning that goes on between the members of primary groups. The informal learning that goes on in the home, on the playground, among neighborhood groups and

other primary groups, or between individuals in social situations, is perhaps our best example of educational efficiency. The socialized recitation has some of the characteristics of this kind of learning, and instances of it are to be found wherever pupils get together in give-and-take situations. In a sense the learning that goes on here is incidental, in that there exists neither the purpose to teach nor formal intention to learn. At first thought the admitted efficiency of this kind of learning may seem to contradict the statements just made about incidental learning. There is, however, one important psychological distinction between the conditions of incidental learning in primary groups and incidental learning in the instances referred to there. While there is no specific intention to learn in the face-to-face situations of the primary group, the activities are highly motivated. The situations and the responses relate to aspects of a pupil's life that to him are highly important. Here conditions are ideal for the operation of effect or reinforcement. Confirming responses are almost certain to follow. Of course, this kind of incidental learning may lead to some undesirable learning.

Reinforcement Psychology

Reinforcement psychology is associationistic, but there are theorists who belong to the associationistic tradition who place themselves outside the reinforcement group. The reader has met the term "reinforcement" several times already. Reinforcement theory is a name given to a branch of psychology which, following the Thorndike-Hull point of view, holds that reinforcement is an essential condition of learning.

Dollard and Miller have posited four basic conditions of learning: *drive*, *cue*, *response*, and *reinforcement*. Approximate synonyms for these terms are, as they suggest, *motivation*, *stimulus*, *act* or *thought*, and *reward*. "The field of human learning covers phenomena which range all the way from the simple, almost reflex, learning . . . to the complex processes of insight.

Throughout the whole range, however, these same fundamental factors seem to be exceedingly important."¹⁷

Learning theory today actually encompasses a great deal more than the traditional subject matter contained in chapters on learning in our textbooks in psychology. Hull, Dollard and Miller, and other exponents are striving for a comprehensive behavior theory. Such a theoretical system must explain how animals learn, how people learn—in the laboratory, in the classroom, in character forming, in personality-trait forming, in language and thought acquisition, in attitude acquisition—even how a whole race or people acquires and transmits taboos, customs, beliefs, and for that matter, their entire cultural heritage. Obviously, such a theoretical system requires a great deal of spelling-out and elaboration over and above the statement of the four basic conditions suggested above—*drive*, *cue*, *response*, and *reinforcement*.

Drive and reinforcement. These two factors may properly be treated together. A drive is a condition of want, need, anxiety, and so on that arouses activity and demands satisfaction or reduction depending upon its strength. Thus the satisfaction of a motivating condition is, of necessity, rewarding. Furthermore, the only mechanism of rewarding an act is by the satisfaction of a motivating condition.

In large part, the drives a person or an animal starts life with are innate. They are required before there is time to learn them; more important psychologically, without some initial unlearned drive there would be no mechanism for learning other drives or anything else, there would be no response to cues, no reinforcement. As is well known, these innate drives center around the basic conditions of keeping alive and maintaining the species. Thus we speak of hunger and thirst drives, sleep drives, protec-

¹⁷ J. Dollard and N. E. Miller, *Personality and Psychotherapy* (New York: McGraw-Hill Book Co., 1950), p. 25. See also N. E. Miller and J. Dollard, *Social Learning and Imitation* (New Haven: Yale University Press, 1941); C. L. Hull, *Principles of Behavior* (New York: Appleton-Century-Crofts, 1943); K. W. Spence, "Theoretical Interpretations of Learning," in S. S. Steven, *Handbook of Experimental Psychology* (New York: John Wiley & Sons, Inc., 1951), pp. 690-729.

tive drives—as in the case of pain, extremes of cold and heat, fatigue, and so on—reproductive drives, and various emotional drives.

Drives have stimulus properties. Stimuli may have both cue value and drive value. Some stimuli, such as hunger, thirst, pain, have innate drive value. Others acquire drive value, as will be seen, presently. As just noted, drive stimuli result from the action of some set of circumstances appropriate to their production; pain, by injury or irritation of certain tissues; hunger, by reduction of blood sugar; thirst, by dryness in the throat and mouth. In states of great emotion the stimuli appear to be response-produced. First there is appropriate stimulation from the outside or from our own internal symbolical behavior, which arouses the emotional condition. This condition when aroused has drive value.

At the human level, except in early infancy, most drive-reinforcement conditions are learned. Those existing in infancy or in any and all lower animals would be wholly inadequate to learning to read, fighting a war, or striving to live in the best part of town, or to anything peculiarly associated with mankind. Part of the task of explaining individual differences in personality traits, and differences in attitudes and behavior, as between social classes, tribes, and nations, is that of accounting for differences in learned drive-reinforcement conditions. Of course, the powers of cue differentiation and the powers of response, as well as the nature of the cues present, are limiting factors.

Thus in psychology the question of learned drives and learned reinforcement becomes an extremely important one. Learned drives are commonly referred to as secondary drives, as opposed to the primary or innate ones. In the same sense we may speak of secondary reinforcement, involving the satisfaction of a secondary drive. As has just been said, some drive-reinforcement mechanisms, those called primary, exist in nature. All higher animals, say all vertebrates, apparently are equipped with a common stock of these mechanisms. Supposedly man has no primary drives that other vertebrates do not have. Primary drives

differ from secondary ones not only in origin but also in another important respect: they cannot be extinguished, as secondary ones can, by nonreinforcement of response. (Experimental extinction will be discussed presently.)

We educational psychologists can say that the first task of the learning theorist is to explain the learning of drives. This must be done in terms of the basic mechanisms of learning. Until proved otherwise inadequate, the canon of parsimony demands that the same set of basic operations be regarded as adequate to the explanation of all learning. We may also seek to explain the origin of learned drives in terms of their influencing conditions. Here we are concerned with the question of why different people learn different drives—people in different periods in history, people in different nations, tribes, sects, social strata, families, and different members of the same family. Some of this is the concern of sociology and cultural anthropology.

Secondary drives differ from primary ones, as has been noted, in origin and in the fact that they may be reduced or extinguished by nonreinforcement. But what is of greatest significance is the fact that they function like primary drives in learning and adaptive behavior. Thus a learned drive may function to arouse activity or initiate practice, to define problems and solutions, and to determine reinforcement or reward.

In an interesting and frequently mentioned experiment Wolfe trained chimpanzees to secure food by the expedient of inserting poker chips in a vending machine. In time the poker chips seemed to acquire considerable value. The animals showed tendencies to hoard and conserve them, and to work to secure them, as evidenced by pulling a lever against a weight.¹⁸ Subsequently Cowles found that poker chips, having been associated (paired) with primary reinforcement a sufficient number of times, acquired drive-reinforcement value. This is shown by the fact that after training, poker chips could be used to motivate and reinforce the learning of other tasks. We may assume that an ani-

¹⁸ J. B. Wolfe, "Effectiveness of Token Rewards for Chimpanzees," *Comparative Psychology Monographs*, 12 (1936), No. 60.

mal could not learn if he found wrong responses as rewarding as correct ones. In another experiment Cowles gave the chimpanzees poker chips previously associated with food when they made successful discriminatory responses, and different poker chips that had been associated (paired) with the responses that did not deliver food—but always a poker chip after each response. It is thought that the fact that the discriminatory responses were readily learned under these conditions shows that the drive-reinforcement value of the poker chips was learned as a consequence of their having been paired previously with a primary drive-reinforcing situation, the securing and eating of food.¹⁹

In another experiment Miller induced fear reactions in white rats by administering electric shocks. A rat was placed in a white compartment of a box, where the shock was given. Escape could be effected by passing through a small door into a black compartment. After a few trials of shock and escape the rat was placed in the white compartment without shock. Now the animal showed the same fear and escape reactions as when the shock had been applied. We may assume that the white compartment had acquired drive-stimulus properties. Miller had, of course, determined that the white compartment had no such properties before the administration of the shocks there. Further evidence that the white compartment had taken on drive properties was provided in the following way. The door between the two compartments was closed. It could be opened by turning a wheel. Now when placed in the white compartment the rat showed the usual signs of strong fear, and the usual exploratory behavior, or as we may say, trial-and-error behavior. When in the course of this behavior the wheel was turned, the door opened, permitting escape into the black compartment. The rats learned readily, showing typical learning-curve phenomena. According to the system of psychology under discussion, the white compartment had taken on drive properties, here a fear drive. The wheel-turning response was rewarded by escape—presumably by fear reduction. It was also

¹⁹ J. T. Cowles, "Food Tokens as Incentives for Learning by Chimpanzees," *Comparative Psychology Monographs*, 1937, 14 (1937), No. 5.

found that the wheel-turning responses could be extinguished by nonrewarded trials. This was accomplished through an arrangement whereby the turning of the wheel no longer led to the opening of the door. While this particular response was extinguished, the fear was not, as shown by the fact that the animals could now learn a new escape response, by depressing a bar.²⁰

Dollard and Miller discuss at some length the question of extinction of fear itself. They take the position that learned fears are probably subject to experimental extinction, "so that they became weaker during a series of trials without primary reinforcement."²¹ They warn, however, that this may be difficult to accomplish; in some cases, extremely so. Perhaps something like experimental extinction happens in the psychoanalyst's office as the patient is encouraged to talk repeatedly about his anxieties and conditions calculated to arouse them. The psychoanalyst is an accepting, non-scolding listener. This may provide something akin to nonreinforced practices. Also this appears to be the rationale of certain practices in speech therapy for stutterers. Stutterers are encouraged to stutter in all kinds of speaking situations—on the telephone, in stores, in conversation with strangers on the street corner. Instead of trying to talk without stuttering, which one might at first think to be the proper procedure, stutterers are advised to stutter freely, and in different ways, and to do so more than their handicap requires. There is more than a single reason for this procedure, but one of them seems to be that of providing practice in nonreinforcing situations. It is hoped that nonreinforced practice will help to allay fears and anxieties about nonfluency—which, it is thought, is the reason for stuttering in the first place.

Human beings are not only equipped with primary drives, but also with certain primary instrumental behavior tendencies directed toward the achievement of the goal objects by which

²⁰ N. E. Miller, "Studies of Fear as an Acquirable Drive: I, Fear as Motivation and Fear-Reduction as Reinforcement in the Learning of New Responses," *Journal of Experimental Psychology*, 38 (1948), 89-101.

²¹ *Op. cit.*, p. 71.

the motivating conditions are satisfied. Sears has pointed out that the instrumental behavior of a hungry infant consists of general restlessness, sucking movements, and crying. Also, in the human infant, as he suggests, the intervention of certain instrumental events is necessary for the goal response (feeding).²² In this case the instrumental events are those connected with another person, normally the mother. In addition to making possible the goal response she normally performs certain other motherly behavior—smiling, fondling, talking softly, caressing—at the same time. Probably at the outset the mother, the necessary instrumental events, and the other accompanying motherly behavior are non-reinforcing stimuli. This brings us to another principle in learning; namely, the effects of reinforcement of a response to a given stimulus (in this case hunger) tends to involve other stimuli present (in this case motherly smiling, fondling, and so on), so that they also become cues to the response. In addition, those environmental events immediately preceding and accompanying the goal response take on reinforcement value. Thus stimuli that first may have had only cue value now have reinforcement value also.

Here the infant's problems begin to multiply. In addition to the instrumental behavior he came into the world equipped with, he must learn instrumental behavior for the satisfaction of these new goal objects—his mother's loving behavior. He learns the appropriate responses as a result of reinforcement. One is prompted to observe that it is a lucky thing that the mother need not be conscious of reinforcement phenomena in this case. Her own natural inclinations are adequate—responding with fondling and other approving behavior when the infant coos, smiles, or indulges in vocal play. When these stimuli have thus acquired reinforcement value, they are now adequate to provide the reinforcement for learning other drives and instrumental behavior appropriate to their satisfaction.

²² R. Sears, "Personality Development in Contemporary Culture," *Proceedings of American Philosophical Society*, 92 (1948), pp. 363-70.

We may find the terminology used in this connection a bit confusing, since different writers may employ the terms in different ways. One of the writer's colleagues, Professor I. E. Farber, has called his attention to these usages: (1) events associated with drive states become secondary drives; (2) events associated with reinforcing states become secondary reinforcers; (3) events associated with the satisfaction of secondary drives become secondary reinforcers; (4) absence, or expectation of absence, of secondary reinforcers creates secondary drives.

Drives are reduced (needs are satisfied) by the achievement of goal objects. A hunger drive is satisfied by the achieving of the goal object food; a self-enhancement drive, by the achievement of the goal object social recognition. Selfhood drives are, of course, extremely complex organizations of stimuli. Even hunger drives in a civilized adult may include a great deal more than contractions in the stomach. The goal object becomes much more than food. It is particular kinds of food, prepared and served in particular ways, in particular places and even in the presence of a particular class of people. Here we have a case of an organization of primary and secondary drives. As social approval generalizes it becomes one of the principal facets of what we call *self*. Another group of important secondary drives may be termed love and affection drives. These are also a part of the self-realization drives. The scheme by which drives of this class are learned has not been worked out in any detail. Perhaps a reinforcement theorist would not view them as presenting any particular embarrassment. One may conjecture that drive-reinforcement mechanisms learned in early infancy, as in Sears's schematization described above, serve to motivate and reward approval-seeking and affection-seeking behavior. Once social approval and affection drives become firmly learned and generalized to some degree, they can be buttressed from another source; namely, fear and anxiety—fear and anxiety about losing approval and affection. As will be seen presently, anxiety is regarded as a major and an extremely important secondary drive.

Cue and response. Drive and reinforcement are treated together

because they seem to belong together. This is also the reason for discussing cue and response under a single head. The first and most obvious fact that presents itself is this: To learn to make a response to a specific cue, that cue must be differentiated, it must be distinguished in some way from other sensory phenomena, and the response must be made. Needless to say, the latter implies that the learner must be capable of giving the response.

Perhaps a moment's diversion is in order. What is said in the preceding paragraph is said in the name of reinforcement psychology. The importance of cue perception is readily accepted and considerably elaborated by *field* psychology. But the latter does not go along at all on the cruciality of the response or for that matter, of reinforcement and motivation.

The central position of cue in learning is illustrated by Dollard and Miller's well-known informal experiment of teaching a small child to secure pieces of candy hidden under a particular book in the library. Success demanded that the child be able to distinguish in some way that special book from the others present—by color, size, position, or some other feature. Moreover, it is implied that the cue should either present constant differentiating features or that these features, if they change, change in meaningful ways. If a dog can learn to respond to a pitch of 250 d.v. per second by virtue of reinforced trials and not to a pitch of 254 d.v. per second by nonreinforcement, we say he can discriminate between the two pitches. Indeed that is the purpose of such an experiment—to see how fine a discrimination in pitch a dog can make.

There is a great deal more to this than simple sensory discrimination. If we present to a school child the numbers 10, 21, 32, 43 and ask him to respond with the next two numbers, we are presenting a situation susceptible to insight. If this is achieved, we may get the right response from the child on the first trial. If not achieved, it might take dozens of trials—always rewarding the correct responses and never the wrong ones.

This brings us to another problem. Why does one child or adult achieve better discrimination, differentiation, or insight than

another? Some have better minds than others, higher IQs, but this is only a part of the story. Some have *better-trained minds* than others. If during a football season our Iowa coaches wanted to learn something about Wisconsin plays and players, it would do no good to send the writer to scout them. He simply would not see anything of any use. He could do somewhat better reporting on Wisconsin's School of Education or Department of Psychology. It generally takes a certain amount of training to see very much. The writer is always chagrined that in looking at fine paintings he does not see any of the techniques by which the critics say the artist accomplished his effects, at least not until he has read what they have to say.

Apparently some inventions require a tremendous stroke of genius. It is said that the wheel was invented only once in all history. The Indians on the two American continents during the 25,000 years of their existence there had never seen a wheel until the European arrived. Other inventions, often extremely complex ones, may be achieved by several different people in different countries at more or less the same time. This adds up to the fact that many kinds of insight require a tremendous amount of knowledge, training, and in many cases must await the development of knowledge.

The tiny inverted picture of the sunset on the retina of a Ruskin and the . . . African [tribesman] are identical, but do the two men see the same? Nay, does the one man at different times in his life see the same world? ²³

In a complex learning situation of the problem-solving or insightful sort it is difficult to draw a strict dichotomy between stimulus and response. We psychologists may do so fairly well at the beginning and at the end of learning. In the beginning we can say this is the stimulus, and in the end we can say this is the response. But in between there can be considerable interaction such

²³ B. C. Mulliner, introductory notes to her translation of J. F. Herbart, *The Application of Psychology to the Science of Education* (New York: Charles Scribner's Sons, 1898), pp. lxiv-lxv.

as to make it difficult to say precisely which is which. As analysis of the problem goes forward differentiation and organization may actually involve tentative responses.

As has been noted repeatedly, S-R psychology assumes that what one learns in the last analysis is a response. This implies that the learner be able to make the response. At some levels of description this is a pretty straightforward matter. We would expect a monkey to be able to learn to open a locked door with a key. We would not expect a hen, or even a rat, to do this, because of the inability to make the response. In cabinetmaking a professor may understand about sawing boards as well as a cabinet-maker. Execution by cabinetmaking standards is another matter. In a problem in higher mathematics the final writing down of the correct answer may be simple enough. A school child could do this. Here understanding, the perceptual analysis of the cues, the interaction between elements in the cue situation and tentative symbolical responses, are the crucial elements. Thus in some situations learning may be limited largely by the learner's ability to execute the right response; in others, by his ability to perceive what response should be made. Field psychologists have performed an important service in emphasizing the significance of perception in learning. In school situations this often appears to be the most important element. This is doubtless true, if we add the proviso that perceptual analysis is achieved by the aid of tentative responses. Perception is not achieved independently of possible responses. Response is a part of what perception is. Thus in a complex learning situation we do not first have perception, then response; both are continually going on, continually interacting one with the other. It is only the final end response that can be set apart as *the* response.

In the polemics between S-R and field psychologists there developed an early and unfortunate controversy over the issue of trial-and-error learning and insightful learning. It is now generally recognized that there is no distinction here of any theoretical importance. What we seemed to have was trial-and-error motor behavior on the one hand, and trial-and-error symbolical behavior

for the most part on the other. One type of learning involves, or may involve, as much trial and error and as much insight as the other.²⁴

Experimental extinction. Only the barest outline of reinforcement psychology has been presented in the foregoing pages. Each detail has a long history and has been the subject of many experimental investigations. A good example of this is experimental extinction. Investigators have devoted a considerable amount of time to the working out of the conditions governing the rate of extinction. This rate is known to vary inversely with the strength of the habit and the strength of the drive, and directly with the strength of competing responses. It also proceeds faster as the interval between nonreinforced trials is shortened. At the practical level habits of success and failure appear to be quite important. A person who has been in the habit of succeeding, and who in the past has finally been rewarded for persistence even in the face of repeated failure is more likely to persist in an undertaking than one who has been in the habit of giving up easily. Of course, it is possible that a person who prides himself on "not being a quitter" may actually possess the mechanism for self-reward of unsuccessful trials. Practice without reinforcement leads to the extinction of habits.

Generalization. Similarly, there is an extensive literature on generalization. This concept embraces *assimilation*, discussed earlier in this chapter, but is more inclusive. In recent years generalization has become more or less synonymous with transfer of training. Many of the conditions of generalization have been worked out in considerable detail. One of the key conditions is similarity between the influencing and the influenced functions. Thus we can say that reinforcing a response to a given cue situation not only strengthens the learner's tendency to make that response to that cue situation but also to make that response to similar cue situations. As stated earlier, there are several kinds of similarity. Perhaps the term "relevant" is close to what the psy-

²⁴ Cf. J. W. Tilton, *An Educational Psychology of Learning* (New York: The Macmillan Company, 1951).

chologist means by "similarity" in this case. In all complex situations the intelligence of the learner is an extremely important condition of transfer, especially in regard to avoidance of undergeneralization and overgeneralization. The conditions of generalization are discussed more fully in a later chapter.

Gradient of reinforcement. An important aspect of reinforcement psychology is the *gradient of reinforcement*, suggested by Hull in 1932.²⁵ The more immediately reinforcement follows a response, the more effective it is. In certain learning situations, especially noninsightful ones, this phenomenon has considerable explanatory value. In complex trial-and-error learning the learner may make a number of different responses before the successful response is made. The correct response is always the one closest in time to the reinforcing event. The other responses, depending upon the order in which they are made, are farther away in time from the reinforcing event. Thus they are assumed to become weaker and weaker relative to the strength of the successful goal response. Again there is a sizable experimental literature on the gradient of reinforcement effects.

The anticipatory response. This is a crucial concept in reinforcement psychology. The term "anticipatory response" refers to the fact that with practice reinforced responses tend to occur at a point of time earlier than that at which they occurred in the original response series.²⁶ That is to say, the responses are anticipated ahead of time. It is this phenomenon that enables the reinforcement psychologist to treat punishment in terms of reward, as discussed earlier. Escape or avoidance responses in punishing situations are rewarding. In similar subsequent situations the avoidance responses are anticipatory, made before punishment—the electric shock, the burn from a stove—is actually received. Anticipatory responses may thus be rewarded.

A child who feels insecure about the affections of certain adults or certain children, and who as a concomitant circumstance has

²⁵ C. L. Hull, "The Goal Gradient Hypothesis and Maze Learning," *Psychological Review*, 39 (1932), 25-43.

²⁶ Dollard and Miller, *op. cit.*, p. 57.

developed feelings of anxiety about their affections, may be overly careful about doing things that threaten his security. This kind of thing may be involved in what we think of as a timid or shy child. Each time such a child escapes arousal of anxiety, the conforming, nonaggressive, withdrawing behavior is reinforced. In this way symptoms of timidity and shyness may be learned. This may be one of the consequences of child-rearing practices that feature excessive punishment. Apparently attention-getting behavior in a child anxious about his status is subject to the same interpretation. Upon occasion the child says something or does something that brings forth commendation. This reduces his anxiety feelings, a reinforcing event. In the future this act or another to the same purpose may occur as an anticipatory response. This is more than an academic question. Its correctness or falseness will make a great deal of difference in prevention and therapy.

Some applications. As noted earlier, reinforcement psychology purports to be a comprehensive approach to the understanding of learned behavior in general. Attempts are going forward to spell out the details of many kinds of learnable behavior in terms of the reinforcement framework. This is the import of the Dollard and Miller book *Psychotherapy and Personality* with its special emphasis upon the learning of both *neuroses* and the *therapeutic behavior*.²⁷ Another example is Murdock's *Social Structure*, which treats of folkways, customs, and beliefs that are learned by mankind and passed on as a cultural heritage.²⁸ Whiting and Child have attempted something of the same thing in their cross-culture study of child training and personality,²⁹ as have Mowrer and various contributors in a recent publication on psychotherapy.³⁰ Again, this is more than an academic issue.

²⁷ *Op. cit.*

²⁸ G. P. Murdock, *Social Structure* (New York: The Macmillan Company, 1949).

²⁹ J. W. M. Whiting and I. L. Child, *Child Training and Personality* (New Haven: Yale University Press, 1953).

³⁰ O. H. Mowrer, *et al.*, *Psychotherapy, Theory and Research* (New York: Ronald Press Co., 1953).

Field Approaches to Psychology

Thus far in this chapter we have considered principally the associationistic tradition in psychology, S-R psychology, which is a kind of lineal descendant of associationism, and finally have discussed a bit more fully reinforcement S-R psychology. Owing to the prestige and the vigor of Hull and his students, reinforcement psychology has attracted quite a following. (However, there are eminent S-R psychologists, for example Guthrie, who do not accept reinforcement as an essential condition of learning. For this group *contiguity* occupies a more crucial position than reinforcement.) Also there are S-R psychologists, for example Mowrer, who do not regard reinforcement as a necessary condition to learning at the conditioned-response level, but who take the position that it is a requisite at other levels.³¹

The term *field psychology* is made to cover three schools, *gestalt*, *topological*, and *organismic*. Gestalt psychology is best known in America through the writings of Wertheimer, Köhler, and Koffka, all Germans who later settled in America. Topological psychology was developed at the hands of another German, Lewin, who spent a major part of his professional life in America. The branch known as organismic psychology was developed largely by Wheeler, an American.³²

The term "field" is applied to these three approaches because of the fact that the three in common emphasize the role in perception of field properties, patterning, configuration, figure and ground, structuring. Moreover, perception occupies a more significant role by far in behavior in the field approaches than in the traditional S-R approaches. For example, in learning, the response

³¹ For references see K. W. Spence, "Theoretical Interpretations of Learning," *loc. cit.*

³² W. Köhler, *The Mentality of Apes* (New York: Harcourt, Brace, and Co., 1925); K. Koffka, *Principles of Gestalt Psychology* (New York: Harcourt, Brace, and Co., 1935); M. Wertheimer, *Productive Thinking* (New York: Harper and Brothers, 1945); K. Lewin, *Principles of Topological Psychology* (New York: McGraw-Hill Book Co., 1936); R. H. Wheeler, *The Science of Psychology* (Ed. 2; New York: Thomas Crowell Co., 1940).

is conceived to have relatively little importance. It is perception, the structuring of field properties leading to insight as may be said, the determinant of the response, that counts. The response becomes the sign of learning. At the phenomenological level of description it must be admitted that this is true. As has already been said, if by response we mean the final end response, this on the face of it must be accepted. If the matter were as simple and clear-cut as it may at first look, the S-R psychologist would not have a chance. It must be obvious to everyone that in the case of most learning in school, insight, understanding, is what really counts. The argument is not about the *value* of insight in learning, but about the question of the conditions determining it. Are responses, reinforced or otherwise, implicated in our achievement of insight? If psychologists should some day agree upon a negative answer, the field approach will of course have won the day—insofar as this issue is concerned.

No system of psychology could stand to be put in the position of being unable to deal with the most important aspect of intelligence. In all probability there are plenty of S-R theorists who feel that psychological theory and supporting experimental research are not ready to deal with insight—that is, the nature of insight. Everyone admits its importance in learning and in behavior in general. In education we talk about its *uses*, and about teaching procedures designed to bring it about. But neither the teachers nor the ablest psychologists among us really know what insight is basically as a psychological phenomenon. The field psychologists are in no better position. To say the least, S-R psychologists were unprepared for these developments. Regardless of how the issues separating field and S-R theory are finally resolved, it must be admitted that the field approach has been of great significance. It has had significant effects *upon* psychology. Its proponents have made significant contributions *to* psychology.

It is not possible to present here anything resembling a comprehensive treatment of the field approaches. As in the case of S-R approaches, a few of the major issues and lines of development

will be singled out. The organismic and topological branches will not be touched upon at all.³³

The bundle hypothesis. Gestalt psychology began in a rather curious way. In 1911 Wertheimer was making some observations on the *phi* phenomenon, known otherwise as the phenomenon of apparent movement. This is the basis of the illusion of movement in the motion picture. The facts are essentially these: If two lines, two dots, two letters, or two other objects separated one from the other by about 1 cm. at reading distance are presented one after the other within an interval of from .030 to .200 of a second (.060 being optimal), only one object is seen, and it appears to move from the position of the first object to the position of the second. Incidentally, if the interval is less than .030 of a second, two objects will be perceived as simultaneously exposed; if greater than .200, two objects will be seen as successively exposed, each in its own position. Thus in simulated movement we do not have movement in the sense that the objects projected on the screen actually move. They are still objects. Wertheimer saw something significant in this; namely that the *whole* (movement) was something more than the simple sum of its *parts* (still objects). Apparently this led to the general and widely quoted dictum that *the whole is greater than the sum of its parts*. It is obviously true that the whole is, or may be, greater than—at least different from—the sum of its parts. If we place some red and some blue color on a wheel and spin the wheel, the observer will perceive a purple color, which appears to be a sum of the parts. At least it is like the parts. But if we thus mix red and green and do so in the right proportions the observer will see a gray that is not like either of the component colors. This is a common phenomenon in chemistry. Water does not look or feel or taste much like its constituent elements.

Wertheimer reasoned that since the whole is greater than the sum of its parts, it cannot be made up by the process of adding

³³ The student will find excellent and generally sympathetic summaries in E. R. Hilgard, *Theories of Learning* (New York: Appleton-Century-Crofts, Inc., 1948).

part to part, as by binding them together through *associative* processes. This argument was aimed against association in general as a frame of reference in psychology. Thus the "bundle hypothesis," which, as Wertheimer saw it, was implicit in associationism, became the object of attack.

It must of course be admitted that the whole is, or may be, something different from the sum of its parts, although we may have to pass over quite a bit to get from this to the assertion that we should "teach the whole child." This issue does not appear to be particularly crucial today. It is not one of the focal points in the debate between S-R and field theorists.

We cannot simply discard the bundle hypothesis. Psychology must account for these "wholes" somehow. They are among the most obvious facts of mental life. For example, you never saw *dog* in your whole life. You have only seen dogs. You never saw *two*, or *male* or *female*. Since the days of Locke scholars have agreed that our concepts are learned. At one level of description it may be said that we learn similarities, similarities in the midst of numerous differences. The fact that this female dog may be much more like that male dog than she is like this other female dog, or this female chicken, does not occasion any difficulty once we have abstracted out the elements of similarity in female. The two-year-old child may have a great deal of difficulty with "two." We say this is two apples; this, two blocks; that, two dolls, and so on. Of course apples, blocks, and dolls are different enough. When the child comes to see that the similarity involved is a numerical one, his troubles are ended.

What is a concept? It is a perception, a perception of essential, constant similarities. It is also a response, in S-R language. Indeed S-R psychology regards the response in this case as being essential to the perception, even as being father to it. Stratton's famous experiments and subsequent verification of them seem to suggest this. By the use of prismatic lenses the visual field was inverted 180 degrees. Things were now upside down and inverted with respect to right and left. The subjects continued the constant wearing of the lenses and continued to make adjustments to the spatial

world. In the course of time they were able to make correct localizing reactions. When this occurred, they began to see things "rightly" through the prisms.

The completeness of a person's understanding of "dog" is a function of the number of responses he can make about it. A very small child may at first apply the word "dog" only to a black dog or to one of a certain size. Most of us have seen enough dogs, can make enough statements about dogs, to be able to differentiate such animals from other species. Still we might be fooled; not so a zoologist, who is acquainted with all the essential elements of similarity common to the species. He can make all the responses that are necessary for certain differentiation of *dog* from other species. The S-R psychologist assumes that the response plays a guiding role in our perceptions and is the synthesizing element in our concepts. The gestalt psychologist does not give this role to the response. He conceives the matter rather to be one of dynamic organizations of field properties, a matter which is to be discussed further presently.

Insight. A few years after the work with apparent movement, Köhler, by virtue of being stranded on the island of Tenerife and by virtue of being a resourceful psychologist, carried out a number of systematic experiments on chimpanzees. Here he demonstrated that chimpanzees could make use of insight in the solution of certain problems, without all the "monkeying around" displayed by Thorndike's cats. For example, one, Sultan, apparently brighter than the others, succeeded in joining two pieces of bamboo, as two pieces of a sectional fishing pole are joined. With this he would pull in bananas placed beyond the reach of either piece of bamboo taken alone.

When the report of Köhler's work was made generally available in America in 1925 through the English translation *The Mentality of Apes*, it created something of a sensation. It is as if half the world were mad at Thorndike for calling animals stupid and at Watson for having attempted to reduce human behavior to bundles of educated reflexes. It seemed difficult for some to keep in mind that Köhler's demonstration of insight in apes did not

by the same stroke demonstrate it in Thorndike's cats. It should not prejudice the case, however, either way to admit freely the use of insight on the part of any animal group. It is possible that most or all animals are more intelligent than they appear to be when faced with the psychologist's problems, which must be pretty senseless to them. In their own natural mode of life some of them can give the psychologist quite a tussle.

Surely no one ever doubted that human beings are capable of insight. Insightful learning in apes creates no more of a psychological problem than insightful learning in man. But it is true that psychologists, especially the most honored ones, have had little to say about insightful learning even in man. The experimental work with animals by Thorndike and Watson and others at this time (1900-20) was new and exciting. Textbooks had a great deal to say about it. They said little about insight in learning. As Hilgard points out, educators in particular had become dissatisfied with laws and descriptive treatments that seemed to bear so remotely on what they were trying to do. Of course the educator is not terribly concerned about the "education" of chimpanzees. But he is highly receptive to such demonstrations of insightful learning as are found in the work of Katona and Wertheimer.³⁴

Something of a controversy developed over the issues of trial-and-error and insightful learning. Perhaps this issue is not now overly important, theoretically speaking. It is freely admitted that there is trial-and-error learning, both in motor learning of the manual manipulative type and in the ideational type. It is also freely admitted that there is insightful learning upon the part of all beings capable of making use of it. Should someone succeed in demonstrating that cats are capable of this, the psychologist would be inclined to say, "Good for the cats!" but he would not conceive of his problems as having altered.

This discussion should not leave the impression that the con-

³⁴ G. Katona, *Organizing and Memorizing* (New York: Columbia University Press, 1940); M. Wertheimer, *Productive Thinking* (New York: Harper and Brothers, 1945).

troversy over trial-and-error and insightful learning did not amount to much. Actually its effect was great. One cannot say just what immediate impression Köhler's book made on men like Thorndike. It can be said that soon after its appearance interest in insightful learning began to increase. Soon thereafter also Thorndike added the *law of belonging* to his list of basic conditions of learning. It is not suggested that this is in any strict way the equivalent of insight, but doubtless it met in part the need created by Köhler's work in particular, and the gestalt movement in general.

As Hilgard points out, the issue is really more important than the controversy over trial and error and insight. The really important result was to give perception—understanding, knowing what to do, insight, intelligence—its rightful place in learning.

Koffka. Originally gestalt psychologists were not much interested in learning. In fact, their interest is still primarily in perception. They appear to be really interested in learning to the extent that it is influenced by perception. In his *Principles of Gestalt Psychology* (1935) Koffka attempted to apply certain of Wertheimer's laws of perceptual organization to problems of learning. These are the law of *prägnanz*, the law of *similarity*, the law of *proximity*, the law of *closure*, and the law of *good continuation*. Hilgard regards the first, *prägnanz*, as a "guiding principle," and the remaining four as subordinate to it. The law of *prägnanz* seems to state that perceptual organization tends toward a "good gestalt," featured by such qualities as simplicity, regularity, and stability. The law of similarity states one of the conditions of forming perceptual patterns. It says that similar things form groups. Also, a given pattern tends to call to mind similar patterns perceived in the past. Thus similarity is an aid in recognition. The law of proximity says that the probability that objects will be grouped together to form a pattern is a function of their nearness to each other. Closure appears to be one of the things meant by a "good gestalt." Closed patterns are better patterns, more stable. Writers have suggested that in learning, the law of closure is

somewhat analogous to reinforcement. Good continuation seems to be related to stability.

Hilgard has extracted out of gestalt literature and undoubtedly, out of his own experience certain principles governing insight. These are more meaningful to one acquainted with traditional frames of reference found in American psychology that such terms as *prägnanz*, closure, and good continuation. Insight, he says, depends upon *capacity, relevant previous experiences, experimental arrangements*; it follows a period of *fumbling and search*; insightful solutions can be readily repeated; and when achieved, insight can be *used in new situations*. To say the least, these principles underlie most of our psychology and most of our best practice in teaching. One could just as truly assert that learning in school depends upon and accomplishes these things.

Sign-gestalt. Perhaps of all American psychologists, Watson and Tolman have written more to the ordinary educated layman's liking, but for quite different reasons. Watson's subject matter suited the layman. It was just what he wanted a psychologist to discuss; but the way Watson discussed it left a great deal to be desired. In fact, it did not make much sense to the layman.³⁵ On the other hand, the layman may not care a great deal about much of Tolman's subject matter, but his psychology really makes sense to his reader, insofar as he is acquainted with it. Tolman has never had the popular following Watson once had.

To begin with, Tolman is a behaviorist, but, in contrast with Watson's, his is a purposive behaviorism. It never made sense to anyone except a psychologist to say that a rat in a maze or a cat in a problem box does not know what it is doing. The common man assumes that the animal knows what it is doing and that that is why it ~~is~~ doing it. Tolman's behaviorism is purposive. In this sense it resembles the earlier position of McDougall and that of Hull—if by “purposive” is meant “goal-directed.”³⁶

³⁵ J. B. Watson, *Behaviorism* (New York: W. W. Norton Co., 1930).

³⁶ E. C. Tolman, *Purposive Behavior in Animals and Men* (New York: Appleton-Century-Crofts, 1932). Cf. E. C. Tolman, *Collected Papers in Psychology* (Berkeley: University of California Press, 1951).

Tolman's *sign-gestalt* embodies the idea that what the animal learns in a learning situation is the significance of certain signs; or, as he sometimes says, the animal learns a kind of cognitive map. He is not learning responses, but the meaning of certain signs. The response is not what is learned. The response is the utilization of learning. In this Tolman appears to adopt a point of view in harmony with gestalt psychology.

That the learner thus learns the meaning of signs seems like such an obvious thing that one may wonder what objection any psychologist could have to the idea. If in driving along a country road one begins to doubt if he is on the right road or is going in the right direction, the appearance of a familiar bridge, a patch of woods, a bluff on the left side of the road, and so on may be quite reassuring. Probably no one could find any real objection to the phenomenon. It seems obvious enough that people do this. If the signs along a learned route were changed enough, the traveler could get lost. Controversy arises when we inquire what a person learns when he learns the meaning of a sign. If a man chooses to believe that learning a sign means the learning of a response, he can be called an S-R psychologist. If not, he would be called some kind of field psychologist, or a psychologist having such leanings.

These learned signs not only serve the cognitive function of guiding the rat through the maze, or the horse homeward on a lonely road, but they also arouse certain expectations—*sign-gestalt* expectations. As a result there may be, after some acquaintance, hastened activity, especially as the animal nears the goal.

If reinforcement theorists could prove that reinforcement is really an essential condition of learning, in the sense that learning never occurs without reinforcement, they could establish their position quite firmly. There is a difference between "an extremely important condition" of learning and "an essential condition." The former has been established. The latter is debatable. Even the *importance* of motivation and reinforcement in learning is such as to leave on shaky ground those who view learning as being chiefly a matter of perception.

Should it be proved that reinforcement is not essential to learning, field theorists would seem to be partially vindicated. However, they would still have to contend with S-R psychology. An unequivocal test case of unreinforced learning has been difficult to provide.

There are several issues that are considered vital to the reinforcement controversy. These are reviewed critically by Melton.³⁷ Perhaps the most crucial is that of *latent learning*. Let us consider one simple illustration. In a typical maze-learning experiment the rat is put in the starting box, is allowed to escape through a door and to enter the alleys of the maze. When he succeeds in threading his way through the maze and reaches the food box, he is rewarded with food. For the moment let us disregard the functions of food and drive except to say that the food provides the reinforcement. What will happen if all the usual conditions of animal maze experiments are observed except one, the food reward? If a rat is placed in a maze a few times and each time allowed to spend some free time there, to explore, look around, or do whatever strikes his fancy, will he later, when induced to get down to business by the introduction of food into the picture, show any signs of having learned anything from his previous explorations? The answer is that he will, quite a bit, in fact. The question of whether or not *all* possibilities of reinforcement were excluded in these earlier free-time periods is another matter. This will serve to illustrate the problem. This issue has been productive of some very ingenious research. It does not seem profitable to review this here. The issue is certainly still debatable.

By way of a short conclusion to this chapter, it may be said that agreement is usually to be found among all schools of psychological thought as to the basic observable psychological phenomena. At a level that actually makes much difference in teaching and learning in school there is not a great deal of disagreement. For example, the importance of knowing what one is doing and what he has done in a learning situation, the impor-

³⁷ A. W. Melton, "Learning," *Annual Review of Psychology*, 1 (1950), 9-30.

tance of insight, creativeness, understanding, is universally agreed upon. The only question is how these things are achieved psychologically. There is no question *that* they are achieved, and that their achievement is crucial in most kinds of useful learning in school. How we *have* insight is of much less importance to the teacher than how to *get* it in practical learning situations. At the practical level we know that motivation and reward are about as important as insight. Their practical importance will hardly be either strengthened or weakened by the ultimate answer to the question of whether it is or is not possible to learn, at least learn something in some way, without any kind of motivation or reward.

There is nothing about latent learning or about any of the other basic issues that separate S-R, S-R reinforcement, and field theorists that tells us how we should teach arithmetic, or what kind of physical-education program we should have in the public schools, or what should be our educational objectives.

ADDITIONAL REFERENCES

- Allport, F. H., *Theories of Perception and the Concept of Structure* (New York: John Wiley and Sons, Inc., 1955)
- Coladarci, A. P., ed., *Educational Psychology: A Book of Readings* (New York: The Dryden Press, 1955), Chapter I
- English, H. B., *The Historical Roots of Learning Theory* (Garden City: Doubleday, 1954)
- Estes, W. K., *et al.*, *Modern Learning Theory* (New York: Appleton-Century-Crofts, 1954)
- Osgood, C. E., *Method and Theory in Experimental Psychology* (New York: Oxford University Press, 1953)
- Pronko, N. H., and Bowles, J. W., Jr., *Empirical Foundations of Psychology* (New York: Rinehart and Co., 1951)
- Snygg, D., and Combs, A. W., *Individual Behavior* (New York: Harper and Brothers, 1949)

XI

INDIVIDUAL DIFFERENCES

Review of Individual Differences

THIS REVIEW OF INDIVIDUAL DIFFERENCES will be restricted to the kinds of differences that have some bearing upon education of school children and adolescents. Some of the important phases of this subject have already been discussed rather fully, notably intelligence (Chapter VIII), socioeconomic status (Chapter II), and certain special deviations, as in the handicapped and the gifted (Chapter IX). The previous discussions of these phases are briefly summarized here. Other phases of the general subject are discussed a bit more fully.

Intelligence. The intelligence-test scores (IQs) of large, randomly selected groups of children distribute more or less normally. The distribution has the characteristics of the normal curve. As already noted, the SD of Stanford-Binet IQs is approximately 16 IQ points. This is the approximate average of the SDs for the various age levels of the standardization cases. This means, approximately, that 68 per cent of the children in the sample, and, if the sample is representative, in the United States, score, or would be expected to score, Stanford-Binet IQs between 84 and 116. In a normal distribution, 68 per cent of the cases on any measure fall within $+1$ SD and -1 SD. Some 2.3 per cent of the cases fall below -2 and above $+2$ SDs from the mean. Thus in the case of the Stanford-Binet test 2.3 per cent of

the children in the general population test at or below an IQ of 68 and at or above an IQ of 132. About 25 per cent test below 90, 10 per cent below 80, 25 per cent above 110, 10 per cent above 120.

As was seen in Chapter V, about 15 per cent of six-year-old children earn MAs of 5 or less. Of twelve-year-old children, about 15 per cent will be two or more years retarded mentally. Proportionate numbers of six-year-old children are one year advanced; and of twelve-year-old children, two years advanced. At the six-year level there is almost a two-year spread in the middle two-thirds alone, and there is a four-year spread for the same limits at the twelve-year level. These differences have a great deal of significance for school management and the progress of pupils in their studies. One of the things meant by "taking care of individual differences" is taking care of differences in capacity or aptitude for learning.

Socioeconomic status. As was seen in Chapter II, pupils differ widely in socioeconomic status. Here the distribution is not a normal one: 1.4 per cent are in the upper-upper class; 1.6 per cent, in the lower-upper; 10 per cent, in the upper-middle; 28 per cent, in the lower-middle; 34 per cent, in the upper-lower; and 25 per cent, in the lower-lower—according to Warner's estimate (Chapter II). Social-class differences are associated with school adjustment in several ways. Social-class ratings are related positively to intelligence-test scores, academic achievement, experience background or "readiness" for learning in school, motivation in school, participation in the extracurricular and social life of the school, and continuation in school.

The latter, continuation in school, is of such importance in our system of public education that it seems desirable to look a bit more closely at some of the facts. The data in Table XVII are taken from one of the earlier investigations in this field by Bell.¹ In this investigation Bell determined the relationship between fathers' occupation and last year of completed schooling for a

¹ H. M. Bell, *Youth Tell Their Story* (American Council on Education, 1938).

sample of 10,908 youth permanently out of school in the state of Maryland (Table XVII). As Bell points out, these results are

TABLE XVII

RELATIONSHIPS BETWEEN GRADE COMPLETION OF OUT-OF-SCHOOL
YOUTH AND OCCUPATIONS OF THEIR FATHERS

Class of occupation	Percentage completing various grades				
	8TH OR LESS	9TH, 10TH, 11TH	HIGH SCHOOL	1, 2, 3 YRS COL.	4 YRS. COL.
Professional—technical	7.6	14.7	32.8	23.8	21.1
Sales	14.2	24.9	40.2	14.9	5.8
Skilled	32.5	31.7	29.1	4.8	1.9
Farm Owner—tenant	48.8	17.1	27.4	4.9	1.8
Unskilled	66.1	21.0	10.7	1.8	0.4

somewhat complicated by the racial factor. The median grade attainment of out-of-school colored youth was 7.5; that of white out-of-school youth, 10.8. He suggests that this difference may in reality be largely an economic one. At least when white and colored youth were equated by fathers' occupation, the racial differences in grade attainment were fairly small.

Neufeldt found that of 276 youth in a certain high school in a Midwestern city who dropped out of school before graduation (and who continued to reside in the city) between the years 1935 and 1939, 58 per cent came from families earning less than \$1000 per year, whereas 1.1 per cent came from families earning more than \$3000 per year.² Karpinos, in his analysis of 1940 United States Census data for all geographic regions of the country, found the following percentages per income group of white urban male youth, between sixteen and seventeen years of age, to be in school: under \$1000, 68; \$1000-\$1999, 81; \$2000-\$2999, 88; \$3000 and above, 92. For all income groups at this age level, the percentage is 76.7.³

² C. J. Neufeldt, "A Study of the Relationship between Socio-economic Status and Continuance in School," Master's Thesis, State University of Iowa, 1943.

³ B. D. Karpinos, "School Attendance as Affected by Prevailing Socio-economic Factors," *School Review*, 51 (1943), 39-49.

The significance of social-class phenomena for education is discussed at some length in Chapter II. Here let us note the fact that our schools are powerless by themselves to cope adequately with social-class problems. Better standards of living, better houses, better economic opportunities, and a better birthright are required, as well as more enlightened ways of handling the problems of lower-class youth in our schools. In commenting upon the African Negro's lot, Malinowski has suggested that for every pound or dollar spent on training the African, ten "should be budgeted for the improvement of the native conditions of life, for the purchase of more soil for the native, and for the creation of opportunities in manual and intellectual work, of which the Africans are now almost completely deprived."⁴

At present we are faced with the problem of desegregation in many of our states having a heavy Negro population. Since by the Warner scale such a high percentage of the Negro population falls within the lower social classes, this will intensify the social-class problems in our schools if desegregation becomes a reality. If it does not become a reality in the immediate future, low social class is and still will be a serious problem in Negro schools, as it has been in the past. It is no secret that in educational achievement Negro pupils as a group do not compare favorably with white pupils as a group. As was indicated in Chapter IV, it would be a mistake in the light of existing knowledge to attribute these differences to differences in race. However, we may be reasonably sure that equality of educational opportunity—if by that we mean attending the same schools as white pupils or separate-but-equal schools following identical curricula—will not make up the difference. Certainly such equality of educational opportunity can be expected to help, and certainly it is to be wished for, but there must be other kinds of equality of opportunity: to own land, to be well housed, to hold office, to enter business, the professions, and skilled trades. Moreover, conditions are thus far so unequal that there is little likelihood that the

⁴ B. Malinowski, "The Pan-African Problem of Culture Contact," *American Journal of Sociology*, 48 (1943), 649-65.

Negro could catch up in these matters, did the opportunity present itself, without a great deal of help. Only when these things happen can we say that the Negro has equality of birthright, equality of educational opportunity in the broadest sense.⁵

Extreme deviations. At least 10 per cent of our school children deviate from the mean sufficiently to pose special problems. Chapter IX is devoted to this subject. Some are crippled to such an extent as to require special schools because they simply cannot carry on in the regular school routine. Others because of the nature of their crippling condition require special therapeutic treatment which cannot be provided in regular schools. In addition to orthopedic crippling many children are afflicted with the ravages of rheumatic fever and tuberculosis. Perhaps 1 per cent of school children stutter or present other deviations in speech sufficiently serious to require speech therapy. Close to 5 per cent are handicapped mentally to such an extent as to require special classes—when the school system is large enough to provide sufficient handicapped children to warrant the organization of such classes. In extreme cases it may be desirable to set up special classes for highly gifted children. From 2 to 5 per cent of the children in the general population are sufficiently bright to make it desirable to have some kind of exceptional program for their education. At the present time some interest is developing for the establishment of special centers for the education and therapeutic care of emotionally disturbed children.

Our schools are interested in all these children for at least two reasons. First, there is the realization that serious handicapping conditions of any kind, if neglected, may interfere seriously with the child's chances of getting an education. Second, our schools for many years have assumed responsibility for the total development of the school child, within the limits of our knowledge and resources.

Chapter IX was concerned with extreme deviations that can best be handled through special education programs. But be-

⁵ Cf. A. Anastasi and J. P. Foley, Jr., *Differential Psychology* (New York: The Macmillan Company, 1949), Chap. XXII.

tween these extremes and normality there are varying degrees of deviation, the care of which is the responsibility of regular teachers everywhere.

Scholastic achievement. One method of expressing differences among pupils in a given grade is in the percentage of those whose achievement deviates from the modal achievement by one or more grades. This is known as the method of grade overlapping. Ayres suggested the use of this method in 1909.⁶ In 1918 Kruse published the results of an extensive investigation of grade overlapping in achievement in the elementary school.⁷ Between 1908 and 1918 quite a body of similar data appeared, much of it as an incidental result of the standardization of achievement tests.⁸ Work on this topic, which went forward rather vigorously for a decade following the appearance of Ayres's book, began to fall off in the early 1920s. Cornell's investigation, published in 1937, is among the few to appear since then.⁹

A fair appraisal of the various investigations places the number of pupils in the various school subjects who equal or exceed the modal achievement of the next grade above at almost one-third. The percentage that falls at or below the modal achievement of the next grade below is only slightly less. About 10 per cent devi-

⁶ L. P. Ayres, *Laggards in Our Schools* (New York: Russell Sage Foundation, 1909).

⁷ P. J. Kruse, "The Overlapping of Attainments in Certain Sixth, Seventh, and Eighth Grades," Teachers College, Columbia University, *Contributions to Education*, No. 92, 1918.

⁸ B. R. Buckingham, "Spelling Ability, Its Measurement and Distribution," Teachers College, Columbia University, *Contributions to Education*, No. 59, 1913. C. H. Elliott, "Variation in the Achievement of Pupils," Teachers College, Columbia University, *Contributions to Education*, No. 72, 1914. D. Starch, "The Measurement of Efficiency in Reading," *Journal of Educational Psychology*, 6 (1915), 1-24 and D. Starch, "The Measurement of Efficiency in Spelling, and the Overlapping of Grades in Combined Measurements of Reading, Writing, and Spelling," *Journal of Educational Psychology*, 6 (1915), 167-86; W. S. Gray, "Studies of Elementary School Reading through Standardized Tests," *Supplementary Educational Monographs*, No. 1 (University of Chicago Press, 1917).

⁹ E. L. Cornell, "The Variability of Children of Different Ages and Its Relation to School Classification and Grouping," *Educational Research Studies*, No. 1 (Albany: University of the State of New York, 1937).

ate from the mode by as much as two full grades above or two full grades below; and 2 or 3 per cent, by as much as three grades. In Cornell's data the grade range, in achievement, of seven-year-old pupils is 1 to 6, the middle 80 per cent spreading over one and a half grades. Her 10-year-old pupils ranged from standard second- to standard ninth-grade achievement, the middle 80 per cent spreading over three full grades.

It is reasonable to suppose that the amount of grade overlapping increases from grade to grade throughout the elementary school. Cornell's results show this to be the case. This increase is probably more pronounced now than formerly, in view of the growing tendency to maintain homogeneous age groups and the consequent reduction in extra promotion and failure. With homogeneous age groups, differences in mental age necessarily increase with age. We may also infer that the amount of grade overlapping increases from grade to grade from another fact, to be discussed presently; namely that equal amounts of practice, and doubtless equal amounts of schooling, tend to increase individual differences.¹⁰

Table XVIII presents some data on grade overlapping taken from the report on the 1951 Iowa testing program in the basic skills.¹¹ The data for selected subjects, reading, language usage, and arithmetic, are averages of scores for about 66,000 pupils, grades 3 to 6. The tests were administered in midyear. Thus the grade equivalent score for the third grade is 3.5, that for the fourth grade, 4.5, and so on. It may be observed that 19 per cent of the pupils at third grade equalled or exceeded the median of

¹⁰ Cf. A. R. Gilliland and E. L. Clark, *Psychology of Individual Differences* (New York: Prentice-Hall, 1939); D. D. Durrell, "Individual Differences and Language Learning Objectives," *Childhood Education*, 12 (1936), 149-51; F. S. Freeman, *Individual Differences* (New York: Henry Holt and Co., 1934); M. E. Irwin, "Motivation, Emotional Responses, Maturation, Intelligence, and Individual Differences," *Review of Educational Research*, 6 (1936), 300-09; W. C. Trow, "Motivation, Emotional Responses, Maturation, Intelligence, and Individual Differences," *Review of Educational Research*, 9 (1939), 285-94.

¹¹ Data supplied by courtesy of A. N. Hieronymus, Director of the program.

4.5—that is, earned grade equivalent scores of 4.5 or better. Likewise 27 per cent of fifth-grade pupils earned grade equivalent scores of 6.5 or better.

It may be seen that for a given school subject there is a tendency for the amount of grade overlapping to increase from the third grade to the sixth. It may also be observed that while the amount of overlapping for reading and language usage is approximately the same, that for arithmetic is very much less. The limited variability in the arithmetic scores in the various school grades on the part of the thousands of pupils represented may be attributed in part to the sequential or hierarchical character of arithmetic. Fourth-grade pupils may have had no experience at all with some of the processes taught in the fifth grade. The curriculum and the instruction are likely to be more uniform from school to school than in the other school subjects. The experiences children have with arithmetic tend more to be limited to the classroom, in comparison with reading and language. In the latter, differences in home background make relatively more important contributions to differences in school achievement.

TABLE XVIII

GRADE OVERLAPPING BY SCHOOL GRADE
AND BY SCHOOL SUBJECTS

<i>Grade Equiva- lents</i>	<i>3rd grade</i>			<i>4th grade</i>			<i>5th grade</i>			<i>6th grade</i>		
	R	L	A	R	L	A	R	L	A	R	L	A
9.5										9	3	0
8.5							7	5	0	16	12	1
7.5				4	2	0	14	11	1	33	28	11
6.5	3	1	0	12	8	1	27	22	10			
5.5	7	5	0	30	26	10				27	25	13
4.5	19	18	6				26	24	14	13	8	2
3.5				23	20	10	10	5	2	5	2	0
2.5	14	10	1	4	3	0	1	0	0			
1.5	0	0	0	0	0	0						

This table shows the percentage of pupils at a given grade level deviating from median performance by one, two, and three grades.

Height and weight. Within any age group of pupils we find wide differences in height and weight, as is well known. For example, approximately 20 per cent of ten-year-old boys and girls equal or exceed the median height of eleven-year-old children of their own sex. Approximately an equal percentage will not exceed the median of nine-year-old groups. Between 5 and 10 per cent will not exceed the average for eight-year-old groups; and 5 to 10 per cent of ten-year-old children will equal or exceed the means for twelve-year-old groups. Deviations in weight are almost as great.¹²

No doubt there are many individual cases in which height and weight deviations are quite serious, educationally speaking, especially when related to nutritional, glandular, or other specific conditions, or to poor health in general. Extreme deviations stemming from whatever cause may pose certain problems of social and personal adjustment. Perhaps the majority of such pupils are able to make satisfactory adjustments. However, great extremes in height and weight offer additional problems to which some kind of adjustment must be made. In general, deviations in height and weight bear little relationship to intelligence or to academic achievement. Simmons reports correlations between IQ and height and weight for a large sample of boys and girls ranging in age from three to fifteen. For boys, her coefficients are negligible for both height and weight at all age levels. They are somewhat higher for girls, but still quite low, below .20, on the average.¹³

Social development. There do not exist any general age scales of social development. In fact it may be a question as to whether or not such a concept has any meaning in this connection. It should be possible for the average six-year-old child to be as well adjusted to his own age peers, for example, as the average ten-year-old child is to his age peers. Thus we cannot apply the

¹² H. C. Stuart and H. V. Meredith, "Use of Body Measurements in School Health Program," *American Journal of Public Health*, 36 (1946), 1365-86; K. Simmons, "The Brush Foundation Study of Child Growth and Development," Society for Research in Child Development, *Monographs*, 9 (1944), No. 1.

¹³ Simmons, *op. cit.* Cf. Anastasi and Foley, *op. cit.*, Chap. XII.

method of grade overlapping which has proved so useful in describing differences in mental, scholastic, and physical growth. There are, however, some useful procedures for analyzing and describing differences in social development within school class groups. One such is the sociometric technique, or as it is sometimes styled, after its originator, the Moreno method.

Essentially this is a method for determining the popularity or acceptability of the members of a group such as a school class. There are several variations of the technique. It may be illustrated by the procedure of asking each member of a class to write down and hand to the teacher the name of the member of the class he would prefer to sit by. Large and significant differences are found. Typically, there are a few "stars"; a few pupils are chosen by many others. They may be thought of as being popular. The leaders are from this group, although leadership qualities are not essential to popularity. On the other hand, the number of pupils who receive no choices, or at best one or two, is relatively large. The few "stars" also tend to choose one another, indicating warm reciprocal friendship ties. There is less of this among the "isolates" and the "neglectees." Here there are fewer reciprocal choices, indicating weaker friendship ties or chum relationships.

Objectives and Practices

So far in this chapter there has been presented a brief review of some of the more important ways in which children differ and some comments have been made upon the extent of such differences. The chief concern has been those differences which are important in school practice. Sex differences and differences associated with age, which are thought to have general interest to educators, but are not so vital in classroom procedures, are discussed in later sections of this chapter.

There are two or three guiding principles that should be kept in mind in thinking about the subject of individual differences. Proper adjustment to individual differences does not mean more individual work, at least not more attention to work which the

pupil does by himself. There is of course a vital place for remedial work, but the purpose of this should be to help the pupil carry on in group work. Today education is committed to the value of group work. The advantages of socialized work are discussed in the following chapter. Perhaps for the present we can agree that in our various efforts to provide for individual differences our aim should be to do so, insofar as this is possible, within the framework of the social group. Part of this can be done in planning the learning projects and activities. These projects and activities should be looked upon as co-operative enterprises. Mutual helpfulness should be the objective. In the learning and investigative phase of the activity each pupil should be expected to undertake those assignments which are commensurate with his abilities. If help is required, he should of course receive it from his teacher, or perhaps from members of his committee, if such an organization is used. Perhaps most of us are committed to the socialized recitation. Each pupil should have ample, *unhurried* opportunity to contribute, and should be expected to contribute at a level that is satisfactory in terms of his ability. If it is from a weak student, the teacher's complete acceptance of a weak contribution is vital to the pupil and to setting the atmosphere of the class. The slow learner should have his say. He has a right to recognition, reward, and feelings of genuinely belonging to the class.

It should also be observed that when we have done the best job we can in taking care of individual differences, the differences will not decrease. They are more likely to increase. If we section pupils according to abilities and provide instruction appropriate to each section, there is the expectation that differences in achievement between members of the section will increase. If we do not section, which may well be the better practice, and do a good job of teaching according to the pupil's ability, initial differences will increase. Thus the objective in meeting individual differences is not to eliminate or to reduce the differences, but to provide the opportunity for each child to develop in accordance with his abilities.

Effect of practice. Because of the fact that there are several ways of investigating the effects of training on individual differences, and because different methods may lead to different results, it seems desirable to treat this question somewhat fully. The issue has provoked considerable discussion since the appearance of Thorndike's first treatment of it in 1908.¹⁴ Do equal amounts of practice increase or decrease differences between good and poor performers, or do they maintain the status quo?¹⁵ Originally, interest was stimulated by the fact that practice provided a means of investigating the nature-nurture problem with respect to various abilities. Some authorities have maintained that if excellence in an activity, for example arithmetic, is largely dependent upon training and very little dependent upon innate capacity, equal amounts of practice should operate to make individuals more alike. This interpretation is reflected in the statement by Thorndike and Hahn that since "equalizing opportunity does not seem to equalize achievement . . . nature, not nurture, seems to be the chief cause of the differences in ability."¹⁶ Perhaps equal amounts of practice should tend to increase individual differences in all tasks that are closely correlated with intelligence or any other innate capacity.

From the beginning, the question of method has been troublesome. More than a half-dozen different methods have been employed in the fifty or more experimental investigations that have been published. Different methods may easily give somewhat different results, even if they are all good; but if a problem is well rationalized and the methods are well conceived, two such methods cannot give diametrically opposed results. Such an outcome is *prima-facie* evidence that at least one of them is not good.

In connection with the present problem two graphical methods

¹⁴ E. L. Thorndike, "The Effect of Practice in the Case of a Purely Intellectual Function," *American Journal of Psychology*, 19 (1908), 374-84.

¹⁵ Cf. Anastasi and Foley, *op. cit.*, Chap. VII, for a comprehensive summary on the effects of practice on individual differences.

¹⁶ H. H. Hahn and E. L. Thorndike, "Some Results of Practice in Addition under School Conditions," *Journal of Educational Psychology*, 5 (1914), 65-84.

have been used, which give opposite results; and two groups of statistical methods, which likewise give opposite results. Inasmuch as there has been considerable divergence of opinion among psychologists as to the legitimacy of the various methods, let us examine them with some care. With the graphical method the performances, on successive practices, of the initially good and the initially poor have been plotted by both the time-limit and the amount-limit method. In the former, time is kept constant, and the amount varies; curves plotted from such data show achievement per constant unit of time. With the latter method, the curve shows the time required to do successively equal amounts of work. For purposes of the problem at hand these two methods are not interchangeable, as they might at first appear. The former, as a rule, shows diverging curves; the latter invariably yields converging ones, as Wells observed in 1912.¹⁷ The two procedures have been used equally often; and equally often the experimenters have come to different conclusions about the effect of practice on individual differences.¹⁸ Obviously, they are not equally good. The converging curves obtained with the amount-limit method appear to be mathematical artifacts. If A does 5 units of work in the first 5-minute practice period, for example, and 10 units in the last 5-minute practice period; and if B does 20 and 30 units in the same two intervals, it is evident that there is more difference between them after practice than before, if the units are equal. They were 15 units apart on the first practice, and 20 units apart on the last. If curves are plotted in terms of amount per 5-minute interval, they will diverge; if plotted in terms of time per unit, they will converge, necessarily: for B reduces his time per unit of work from 15 seconds to 10 seconds; A, from 60 to 30.

A difficulty of the same sort is met in the statistical methods.

¹⁷ F. L. Wells, "The Relation of Practice to Individual Differences," *American Journal of Psychology*, 23 (1912), 75-88.

¹⁸ E. B. Skaggs, "The Effect of Training upon Individual Differences: Series I," *Journal of Genetic Psychology*, 49 (1936), 261-67; and Series II, *idem*, 18 (1938), 357-66.

Satisfactory methods are comparisons of gross gain, correlations between gross gain and initial performance, and comparisons of initial and final σ 's. Methods that do not seem adequate to the answering of the question are those which make use of percentage of gain, correlation between initial performance and percentage of gain, and coefficient of variability. Since the three last-named methods all involve percentages, those whose initial performance is lowest are almost certain to "show" the greatest gain, even though their gross gain be negligible in comparison with that of the initially superior. If A by practice increases his performance from 5 to 10, and B, his from 30 to 45, there is more difference between them after practice than before, although A gains by the larger percentage.

In general it is found that equalizing practice tends to increase individual differences, except when the results are expressed in percentage of gain or some other erroneous method. Chapman obtained a correlation of .40 between initial scores and gross gain in mental multiplication, and a correlation of .20 between initial scores and gross gain in color naming.¹⁹ Race found that the initially superior made greater gross gain in addition and subtraction, and that the initially inferior made the greater gain in cancellation.²⁰

In his investigation in 1908 Thorndike obtained a positive correlation between initial performance in mental multiplication and gross gain by practice, which he generalized as follows:

It seems extremely probable . . . that the man who has the capacity to improve to a given small degree more quickly than another should also improve more quickly to the next degree and should also, by and by, be capable of improving to a higher degree if given the maximum of efficient training.

¹⁹ J. C. Chapman, "Individual Differences in Ability and Improvement and Their Correlation," Teachers College, Columbia University, *Contributions to Education*, No. 63, 1914.

²⁰ Henrietta Race, "Improvability; Its Intercorrelations and Its Relations to Initial Ability," Teachers College, Columbia University, *Contributions to Education*, No. 124, 1922.

Promotion policies. It appears that many more children repeat grades than is generally recognized. Apparently the method used in general practice for determining the rate of failure is that which yields the annual rate of failure in the various school systems. This involves averaging the percentages failing in each grade in a given year. This method is quite satisfactory for certain administrative purposes, but it does not begin to tell us how many or what percentage of children repeat grades in a school system during the course of their elementary schooling. A city school system having an annual rate of failure of 5 per cent may be failing as many as 20 per cent of its pupils between the first grade and the end of the sixth grade. The following is presented as a hypothetical example of percentages failing in a given school year for grades 1 to 6: 10, 6, 4, 2, 3, and 5. The average annual rate here is 5 per cent. We cannot say, however, that a school system having a record the equivalent of this is failing only 5 per cent of its pupils. If the year in question is a typical one, we must say that 10 per cent of the children who go through these grades fail in the first grade alone. If each failing child failed only once, the per cent would be 30, not 5.

Some pupils repeat more than a single grade or repeat the same grade more than once. One method of ascertaining the total number of different children who experienced nonpromotion in the first six grades involves an inspection of all the cumulative record cards of pupils at the time of their promotion to the seventh grade, and recording the number of failures. This was done about ten years ago for the school systems in a number of cities and towns, and in a number of consolidated schools.²¹ The per cents of different children who had failed of promotion at least once in the elementary school ranged upward from about 20. Annual

²¹ F. R. Seeber, "Studies in Failure: II. Failure in the Davenport, Iowa, Public Schools," Master's Thesis. State University of Iowa, 1946; R. Gurren, "A Study of Failures of the Pupils in Grade VI in the Public Schools of Cedar Rapids, Iowa, since Their Entrance into the System," Master's Thesis. State University of Iowa, 1947; E. S. Garland, "The Percentage of Pupils Who Fail in the First Six Grades in Consolidated Schools in Iowa," Master's Thesis. State University of Iowa, 1946.

rates in these same schools ranged from about 5 to 7 per cent. As a kind of rule of thumb it may be suggested that on the whole the percentage of different pupils experiencing failure will run about four times the average annual rate. Some incidental but extensive data gathered quite recently—by Larson *Cf.* Chapter VIII and Coffield, noted presently—suggest that either the earlier results just cited gave a figure too high or that there has been a marked reduction in failure in this region within the last ten or twelve years. Larson's work encompassing a 15 per cent random sample of Iowa schools indicates a figure closer to 10 per cent.

The fact that there are wide variations from school to school within the same city does not necessarily indicate a lack of policy. Neither does the fact that there is no consistent relationship between achievement and nonpromotion. Differences in achievement from school to school within the same city are usually quite large, depending, of course, upon the degree of social and economic stratification. Thus, it follows that a given pupil might not be conspicuously low in one school and yet be hopelessly outclassed in another.

Fifty years ago, at least 50 per cent of elementary-school pupils experienced failure. Ayres, cited previously, reported in 1909 that the average number of years required to complete 8 grades was 9.5. Twenty-five years ago about a third of the pupils failed; fifteen years ago, in Iowa at least, a fifth. Today, in Iowa, the figure is about 10 per cent.

One could make a case for the proposition that there is far too much failure in our schools, despite the fact that no one can quite say just what percentage of pupils should be required to repeat grades. It certainly should not be 20 per cent, perhaps not even 10 per cent. Just which pupils should be required to repeat grades, and how many, should be left to the discretion of teachers and others closely connected with the individual pupils. Probably all of us could agree that the school board and the central administration should have a hand in shaping school policy with respect to failure. But it would seem unwise to impose regulations specify-

ing the percentage that may be required to repeat grades or the percentage that must do so. Some pupils can accept failure better than others. Some teachers and parents can accept it without arousing feelings of guilt on the part of the child. In every case the welfare of the child should be the guiding factor. Failure should not be meted out as a punishment, nor should threat of failure be used as a form of motivation, at least with young children. In considering the welfare of the child we must keep in mind the consequences of failure to his feelings of self-worth and self-acceptance as well as what he is likely to learn by repeating a grade.

The teacher must face frankly the question of whether or not failure accomplishes its purpose, which presumably is to bring the pupil to a better mastery of instructional materials of his grade and to prepare him the better for the grades ahead. Is this being accomplished by nonpromotion at the present time? While there are doubtless many exceptions, the best general answer, probably, is No. Typically, the pupil who repeats a grade is considerably below average for his class in the end. He does, of course, increase in mental age perhaps by from seven- to nine-tenths of a year, assuming that his IQ is somewhere between 70 and 90. The foregoing assumes that the pupil who repeats a grade takes the same work over, more or less. If a different program were given him, the results might be different.

The practice of nonpromotion would be justified, so far as its purpose is concerned, if it could be shown that the pupil was more successful in carrying out the work of the succeeding grades. Here again the data at hand afford little evidence in general that the failing of pupils accomplishes its purpose.²² However, this question cannot be decided by professors any more than it can be by superintendents and school boards. The teachers and principals, who have to live with the problem, should have considerable voice in the matter, although they should be guided by evidence as well as personal experience. One other point

²² Cf. H. L. Caswell, *Education in the Elementary School* (New York: American Book Co., 1942), Chap. XI.

should be noted; namely, that schools which have high rates of failure do not seem to accomplish any more than schools having low rates of failure.

In a recent investigation Coffield followed through to the seventh grade the progress of groups of pupils who failed in the third grade. Their progress was compared with an unfailed group matched with the failed group on the basis of Iowa Tests of Basic Skills scores.²³ He found, first, that third-grade pupils who repeated that grade raised their performance on the Iowa Tests of Basic Skills, but not sufficiently to bring them up to average third-grade achievement. In the second place, he found that those pupils who were required to repeat a grade performed no better on the achievement test scores when they reached the seventh grade than their matchees who had not failed, despite the fact that they had had one more year of elementary schooling.

As another phase of his investigation, as to performance on these tests Coffield compared schools having high rates of non-promotion with schools having low rates. The over-all, school-wide achievement of schools having a high rate of failure was not found to be greater than that of schools having a low rate. This confirms the findings of others and has been interpreted in the past to mean that high rates of failure do not necessarily mean high standards of instruction, at least not higher standards of achievement. This interpretation may be somewhat open to question, as one of the writer's colleagues, Henry DeKock, has pointed out. Elementary schools with high rates of nonpromotion have more low-performing pupils in the several grades than those schools which fail few pupils and thus promote slow-learning pupils out of the elementary school more quickly. The greater percentage of slow learners in those schools having high rates of failure would tend to lower school averages on achievement tests.

²³ W. H. Coffield, "A Longitudinal Study of the Effects of Non-promotion on Educational Achievement in the Elementary School," Doctor's Dissertation, State University of Iowa, 1954.

High standards at the right place. Perhaps school authorities can agree that failure hardly accomplishes its purpose. Failure puts the emphasis on standards at the wrong place. Of course we should be concerned about the slow learner, vitally concerned. But our concern should be about *these* pupils, not about *our* standards. If we are concerned about standards, we should look higher up on the curve of mental ability. Whether we fail 20 per cent or 5 per cent of the pupils in the elementary school, pupils with average and better-than-average ability will scarcely be affected one way or another.

There is always danger that high promotion rates will encourage a kind of slackness in instruction. There is danger that some teachers and pupils may feel that high standards are incompatible with a practice of promoting almost everyone. If we are trying to build up a fine symphony orchestra, we simply keep out the musicians we do not want. Here our concern is not about musicians but about the orchestra. In the public schools our concern is about the pupils, not about the school. Here the reality of providing for individual differences lies in trying to effect the maximum development in each pupil in accordance with his abilities and needs. This means that our policies with respect to the slow learner should have nothing at all to do with our policies with respect to the able student.

Moreover, we cannot be satisfied merely with the best achievement we can get out of the slow learner. We must do our best to see that he derives some genuine satisfactions from his schoolwork, from going to school, and from being a member of his class. We should also keep in mind that all failure is not bound up with nonpromotion. In a system of age grading in which all pupils, or nearly all, are promoted each year, many pupils may experience stark failure nearly every day, unless we can really do a professional job with such pupils. In other words, the evils of failure are not eliminated merely by adopting a policy of universal promotion.

Extra promotions. The psychological test and the standardized achievement test, which came into education nearly fifty years

ago, made it possible to effect grade placement according to abilities to a degree not known before. At first there was a pronounced tendency to make use of these tests for this purpose. Today, however, we find a greater degree of homogeneity with respect to age in our school classes than was the case at that time. Even then the number of overage pupils was considerably greater than the number of underage pupils. This situation still exists, although the numbers of both have been reduced. The fact that there are more overage pupils than underage in school classes, especially when we consider those who deviate from the modal age by as much as a year, comes about from the fact that there has been more nonpromotion than extra promotion.

The achievement test has provided a ready means of investigating the relationship between age and academic achievement within school classes. Generally the correlation has been found to be negative. Within a given school grade the youngest pupils tend to excel, while the lowest performance is found among the oldest pupils. This is what one would expect when pupils of unlike age are found in the same school grade. The oldest pupils will as a rule be those who have failed, most of them because of limited mental ability. The youngest tend to be those who have received extra promotions or who for some reason entered school a little early. If we were concerned solely with the pupils' academic achievement, we might look with favor upon wide practice of nonpromotion and extra promotion. Actually, within the last two or three decades we have witnessed a decline in both kinds of promotion. This practice, of course, makes for greater homogeneity in age and greater heterogeneity in ability and achievement. Within this same period of time there has also developed an increasing interest in the total development of the pupil. Thus we have become increasingly concerned about the effects of school practices upon social development, upon personality, and, to employ one of the clichés of our time, upon the whole child.

There is still far too much failure. Today there is probably not too much extra promotion. Indeed, a very moderate expansion

of this practice might not be undesirable. Such evidence as we have fails to show any untoward effects of allowing exceptionally bright children to skip a grade or two. Of course a school system should decide this issue for itself, depending upon what other procedures are available for such pupils. The psychological effects of extra promotion and nonpromotion do not appear to be the same. These issues are discussed at greater length in Chapter IX.

Sex Differences in Achievement

Sex differences in scholastic achievement have been noted almost from the inception of standardized tests. A comprehensive summary of the early findings has been made by Lincoln.²⁴ Featured in the latter work are the standardization data of the Courtis and Woody arithmetic tests, the Stone arithmetic reasoning tests, the Gray and the Monroe reading tests, the Ayres handwriting scale, the Buckingham spelling scale, the Van Wagenen history tests, and the Trabue language composition scale. The findings may be summarized briefly as follows: Girls excel consistently in arithmetic computation; boys, slightly, in arithmetic reasoning; girls are somewhat superior in reading rate, oral and silent, decidedly superior in speed and quality of handwriting and in spelling, and have a small advantage in English composition; boys excel in history and geography, perhaps in algebra, and rather definitely in geometry.

The results of the many investigations that have appeared since the publication of Lincoln's book corroborate these statements. The sexes have also been compared in a number of different school subjects, a few such investigations are as follows: Jordan, in analyzing the results of the North Carolina high-school senior examination, found an advantage in favor of boys in history and general science and a slight advantage in mathematics.²⁵

²⁴ E. A. Lincoln, *Sex Differences in the Growth of American School Children* (Baltimore: Warwick and York, 1927), Chap. IV.

²⁵ A. M. Jordan, "Sex Differences in Mental Traits," *The High School Journal*, 20 (1937), 254-61.

The girls excelled in English usage; in reading and in literature virtual equality obtained between the two sexes.

Samplings of the Iowa Every-Pupil Tests of Basic Skills, administered in connection with the Iowa Every-Pupil Testing Program, have been analyzed with respect to sex differences. The test papers were segregated by tests, by grades, and by school buildings and arranged alphabetically within each such classification. Every tenth paper was then drawn for purposes of the analysis. The results are shown in Table XIX for grades

TABLE XIX

SEX DIFFERENCES IN ACHIEVEMENT ON THE IOWA EVERY-PUPIL
TESTS OF BASIC SKILLS

<i>Test and Grade</i>	<i>Number</i>		<i>Mean</i>		<i>Critical</i>	
	BOYS	GIRLS	BOYS	GIRLS	<i>Dif.</i>	<i>Ratios</i>
Silent Reading Com- prehension: Part I						
Grade III	351	362	22.85	24.97	-2.12	2.57
" V	346	374	38.30	39.59	-1.29	1.77
" VII	533	541	34.64	34.74	-0.09	.13
Part II (Vocabulary)						
Grade III	351	362	18.62	20.22	-1.59	2.29
" V	346	374	31.71	33.41	-1.71	3.39
" VII	533	541	24.21	24.67	-0.46	0.85
Work Study Skills						
Grade III	334	343	28.28	29.09	-0.81	1.07
" V	350	366	50.60	53.49	-2.89	3.73
" VII	525	542	58.59	60.92	-2.33	2.45
Basic Language Skills						
Grade III	334	338	99.16	109.45	-10.29	5.38
" V	335	363	141.67	152.70	-11.03	7.56
" VII	531	541	198.31	215.54	-17.26	9.92
Basic Arithmetic Skills						
Grade III	334	348	25.87	25.21	+0.66	0.89
" V	345	378	58.14	57.92	+0.22	0.25
" VII	535	546	50.41	50.18	+0.22	0.24

Legend: Pupils in grades 3, 4, and 5 received the Elementary Battery of tests; those in grades 6, 7, and 8 received the Advanced Battery. This accounts for the fact that in most instances the pupils in grade 5 earned higher numerical scores than those in grade 7.

3, 5, and 7. The minus sign is arbitrarily used to signify that the obtained difference favors girls; the plus sign signifies a difference in favor of boys.²⁶

Except for performance on the arithmetic tests, where there is a fractional advantage in favor of boys, the girls have a numerical advantage on every test at every grade level. The same advantage obtains for grades 4, 6, and 8, not shown in Table XIX.

Table XX summarizes a portion of the data on sex differences in achievement at the high-school level yielded by the Iowa Every-Pupil High-School Testing Program between the years 1932 and 1939. In the majority of instances more than one set of values is listed for a school subject. These represent different samplings in different yearly testing programs. As in the

TABLE XX

SEX DIFFERENCES IN ACHIEVEMENT ON THE IOWA EVERY-PUPIL
HIGH-SCHOOL TESTS

Subject	Number		Mean		Dif.	Critical Ratios
	BOYS	GIRLS	BOYS	GIRLS		
Algebra	231	269	16.08	16.72	-0.64	.86
"	530	468	14.94	16.03	-1.09	1.93
Plane Geom.	498	502	13.42	12.20	1.22	3.65
" "	470	530	17.99	17.26	.73	1.58
General Science	260	240	49.54	39.37	10.17	13.98
" "	548	452	47.60	40.70	6.90	8.80
Biology	384	375	61.28	57.74	3.44	2.98
"	546	454	63.32	62.10	1.22	1.37
Physics	479	521	37.94	31.78	6.16	5.13
Amer. Govt.	272	328	48.48	43.63	3.85	4.33
" "	449	551	61.03	48.37	2.68	2.61
Amer. Hist.	424	576	60.40	55.34	5.06	5.11
Contemporary						
Affairs 12th Grade	232	268	33.50	24.52	8.98	6.72
Economics	1122	1286	57.80	54.92	2.88	4.82
Read. Compre.	439	551	78.87	79.71	-0.84	.77
English Correctness						

²⁶ J. B. Stroud and E. F. Lindquist, "Sex Differences in Achievement in the Elementary and Secondary Schools," *Journal of Educational Psychology*, 33 (1942), 657-67.

preceding table, the minus sign signifies a difference in favor of girls.²⁷

In the elementary school the advantage goes to girls; in high school, to boys. This change on the part of boys from an inferior to a superior status probably comes about as a result of a change in the curriculum. Two subjects in which girls have their most marked advantage, handwriting and spelling, do not feature prominently in the high school. Those subjects in which boys excel in the elementary school, the sciences and the social studies, become expanded considerably in the high-school curriculum. Girls retain in high school the marked advantage in English usage that they exhibit in the elementary school. In reading comprehension and in mathematics the differences are small, with the exception of geometry, but tend more often than not to favor girls.

On the whole, sex differences in marks received and in failure, retardation, acceleration, and like evidences of progress in school, are greater than those found in performance on educational achievement tests. Ayres concluded in 1909 that "our schools as they now exist are better fitted to the needs and natures of the girl than of the boy pupil."²⁸ In examining the records of several hundred thousand pupils in various cities of the nation in 7624 high schools analyzed by him in 1906-07, Ayres found that there were 419,570 girls enrolled, in comparison with 314,084 boys. In the elementary schools of 15 cities having an enrollment of 282,179 pupils, 37.1 per cent of the boys and 32.8 per cent of the girls were retarded. Repeating grades were 22.8 per cent of the boys and 20.2 per cent of the girls.

St. John has compared the two sexes with respect to the percentage, at the various IQ levels, being required to repeat a grade and the percentage earning an extra promotion.²⁹ His data treat

²⁷ *Ibid.*

²⁸ L. P. Ayres, *Laggards in Our Schools* (New York: Russell Sage Foundation, 1909), p. 158.

²⁹ C. W. St. John, "The Maladjustment of Boys in Certain Elementary Grades," *Educational Administration and Supervision*, 18 (1932), 659-72.

TABLE XXI
PERCENTAGE OF PUPILS REPEATING AND SKIPPING
GRADES PER IQ GROUP

IQ	<i>Special Class and Repeating</i>		<i>Gaining a Year</i>	
	BOYS	GIRLS	BOYS	GIRLS
140	...	...	66.7	100.0
130	...	...	18.2	33.3
120	...	...	23.3	34.5
110	3.6	2.6	11.9	9.0
100	24.4	18.8	3.0	1.8
90	59.2	48.8	1.5	0.8
80	88.9	86.4	...	...
70	100.0	100.0	...	...
60	100.0		...	

the progress over a four-year period of about 500 boys and 450 girls in grades 1 to 6, mostly 1 to 4, who were enrolled in the various schools of a certain suburb of Boston. The comparisons are shown in Table XXI.

Girls received higher marks in conduct and effort. This result is reflected, perhaps, in the fact that the correlations between IQ and various measures of achievement were higher for girls than for boys.

Johnson's analysis of the records of boys and girls for one semester in 7 high schools in St. Louis is to the same purpose.³⁰ The sex comparisons are as follows:

SEX DIFFERENCES I	Boys	Girls
Number courses repeated first time	2,110	1,517
" " second time	337	166
" " third time or more	71	19
Failure at end of term (per cent)	8.5	5.0
Average age of graduating class	17.7	17.1
Median IQ	105.3	104.8

³⁰ G. R. Johnson, "Girls Lead in Progress through School," *American School Board Journal*, 95 (October, 1937), 25-26.

Ayres attributed the poor showing of boys to "overfeminization" of our schools. St. John voices a similar note, as is seen in the following:

...the consistent inferiority of the boys in school progress and achievement is due chiefly to a maladjustment between the boys and their teachers which is the result of interests, attitudes, habits and general behavior tendencies of boys to which the teachers [in his investigation all women] fail to adjust themselves and their school procedures as well as they do to the personality traits of girls.

In this opinion Johnson concurs. The latter is also of the opinion that teacher appraisal of scholastic achievement is not without sex bias. He points out that in high-school subjects taught by men boys and girls receive comparable marks. It may be, however, that men are more likely to be found teaching those courses in which boys are known to do their best work.

There are also other aspects to the problem. No doubt boys feature in disciplinary problems with much greater frequency than do girls. There appears to be no necessary reason to assume that all so-called behavior problems are symptomatic of maladjustment. Some of them, in fact many, probably reflect group mores. A certain amount of protest is in masculine mores at the juvenile level. Indifferent co-operation and a certain amount of nonchalance about his lessons and general "cussedness" are not only condoned in certain juvenile masculine groups, but also rewarded. For example, the boy who trips a fellow student perambulating down the aisle bent on consulting his teacher is as likely to be suffering from the inner compulsion to have some fun as he is from some deep-seated conflict.

Inasmuch as girls are superior in language functions in school, it may be of interest to point out, as a final word on sex differences, that this feminine superiority in language obtains from the start. Indeed there is more than a suspicion that this feminine superiority in language aptitude also holds in adult life. McCarthy obtained the following means for certain age groups for girls and

boys (average for 50 consecutive samples taken under standard conditions): ³¹

SEX DIFFERENCES II

CA Months	Mean No. Words		Mean No. Different Words	
	GIRLS	BOYS	GIRLS	BOYS
18	28.9	8.7	13.6	5.4
24	87.1	36.8	37.3	16.6
36	176.2	164.4	66.0	60.1
48	218.5	213.4	93.8	91.1
54	236.5	225.4	104.0	95.8

Chronological Age

Age before maturity. Prior to the advent of experimental child psychology, childhood was regarded as the golden age of memory. The stocking of the child's mind in his youth—at a time when he is too immature to be trusted with much thinking for himself—with an array of factual knowledge would, it was held, yield a bountiful harvest in mature life. Childhood was alleged to be the age of memory because it is easier at this time of life to commit to memory the store of knowledge required afterward than it is to commit it at a mature age. Such a point of view naturally led to the placing of great emphasis upon memorization in the elementary school. Fortunately this practice has been discontinued. Today teachers in the elementary grades are as much interested in logical or substance learning as are those at any other level. Moreover, even before this fact was demonstrated by experimental work, knowledge of the development of intelligence, from Binet onward, and any reasonable application of Herbartian psychology should have led to the conclusion that ability in substance learning and memorization of meaningful material increase with age up to mental maturity. It now seems fairly conclusive

³¹ D. McCarthy, "Language Development of the Preschool Child," in R. G. Barker, J. S. Kounin, and H. F. Wright, *Child Behavior and Development* (New York: McGraw-Hill Book Co., 1943), pp. 107-28.

that the child does not even have an advantage in the memorization of rote material. This is illustrated in Table XXII.³²

TABLE XXII

RELATION OF AGE TO POETRY AND NONSENSE SYLLABLE SCORES

Mean CA	Mean IQ	Mean No. Lines	Mean No. Syllables
7.7	115	9.71 \pm .54	4.73 \pm .19
8.5	115	11.16 \pm .43	5.12 \pm .21
9.4	115	13.15 \pm .47	5.82 \pm .23
10.4	111	16.02 \pm .56	6.43 \pm .24
11.7	103	17.55 \pm .65	6.74 \pm .24
14.4	109	21.31 \pm .89	7.39 \pm .30
18.1	114	22.14 \pm .65	8.71 \pm .39

N = 172 elementary school pupils, grades 2 to 6 inclusive; 26 ninth-grade pupils, and 28 college freshmen.

In 1896 Shaw published the results of an investigation bearing on the influence of age upon achievement in logical or substance learning. His subjects were 50 boys and 50 girls in each of the following grades: 3, 5, 7, 9, second-year high school, and fourth-year high school.³³ A specially prepared story was read to pupils, who in turn wrote down as many of the terms—facts and concepts—as they could remember, exact phrasing and temporal sequence not being insisted upon. A total of 152 such terms were contained in the story. Table XXIII gives the average number of terms reproduced per grade group.

A positive relationship has been found with various other learn-

TABLE XXXIII

PER CENT OF TERMS REPRODUCED

Grade:	3	5	7	9	HS-2	HS-4
Score:	17.5	31	40	43	45	42.5

³² J. B. Stroud and R. Maul, "The Influence of Age upon Learning and Retention of Poetry and Nonsense Syllables," *Pedagogical Seminary and Journal of Genetic Psychology*, 42 (1933), 242-50.

³³ J. C. Shaw, "A Test of Memory in School Children," *Pedagogical Seminary*, 4 (1896-97), 61-78.

ing activities. Cases in point are Pyle's investigations of prose-substance learning, and perceptual-motor learning; Heidebreder's³⁴ work on relational learning; and Burt's on reasoning.

Relationship between CA and learning achievement, MA being constant. There is, of course, no efficacy in age as such. Increase in age is important because it is a necessary condition to mental development. This is true whether mental development be a function of learning and transfer effects or of organic maturation, or of both. Insofar as MA, assessed by standard intelligence tests, is a true index of mental development, so far should sheer CA be unrelated to learning ability. Negligible relationships only have been found between CA and learning achievement when MA is held constant. The writer and Maul obtained a correlation of .61 between poetry scores and CA, and of .49 between nonsense-syllable scores and CA. When MA was partialled out, the coefficients dropped to .03 and $-.02$, respectively.³⁵ Roberts' data for the ages 3.6-7.10, published the same year, are in accord.

After maturity. In studying the relationship between age and learning achievement in childhood the condition of drawing comparable samples from the various age groups is satisfied when these age groups are comparable in brightness; that is, comparable in IQ—since IQs do not change systematically from early life to maturity. For older age levels the problem does not lend itself to such ready experimental handling, owing to the fact that test intelligence decreases with age during this period. Here experimenters have undertaken to draw successive age samples

³⁴ W. H. Pyle, *Nature and Development of Learning Capacity* (Baltimore: Warwick and York, 1925); E. F. Heidebreder, "Problem Solving in Children and Adults," *Journal of Genetic Psychology*, 35 (1928), 522-44; C. Burt, "The Development of Reasoning in School Children," *Journal of Experimental Pedagogy*, 5 (1919), 64-77 and 121-27.

³⁵ K. E. Roberts, "Learning in Preschool and Orphanage Children: An Experimental Study of Ability to Solve Different Situations according to the Same Plan," *University of Iowa Studies in Child Welfare*, 7 (1933), No. 3. Cf. A. W. Reitz, "Relationship of Acquired Information or Knowledge Obtained from Certain Educational Motion Pix Films to the Intelligence, Grade, Age, Sex and Type of Educational Training of Pupils," *Journal of Educational Sociology*, 12 (1938), 177-81.

that are continuous with the just-mature sample in the sense that they are drawn from comparable segments of the population. The Bellevue Intelligence Tests should prove to be a valuable addition to methodology inasmuch as the IQs yielded by this scale appear to be free from systematic change as persons grow older (see Chapter VII).

In 1928 Jones published the results of an investigation on the relationship between age and ability to report upon the content of three motion-picture narratives, as determined by objective tests. His age samples appear to have been well chosen and free from the sampling error found in the earlier studies.³⁶

The number of persons over 60 years of age pleading exemption, usually on the ground of reading difficulty, was so great that all papers of those over this age were discarded. The age range of the sampling on which the results of Table XXIV are based is from 11 to 60 years, the total number of cases being 765.

In order to make feasible a comparison of achievement on the three tests, *sigma* scores were computed by the McCall T method. Smoothed scale score medians are shown in Table XXIV for the three tests at various age levels.

In an attempt to find some plausible explanation of the relationship between age and visual memory, as reported in Table XXIV, Conrad and Jones administered Tests A or B together with the Army Alpha intelligence test to a second sampling.³⁷ The representativeness of this sampling was checked against the United States Census data for the state in which the investigation was made, and was found to be fairly satisfactory. It was found, as noted in Chapter X, that intelligence-test performance also declined with age, and seemed to explain the decline in learning scores.³⁸

³⁶ H. E. Jones, "Psychological Studies of Motion Pictures: II. Observation and Recall as a Function of Age," *University of California Publications in Psychology*, Vol. 3 (1928), 225-43.

³⁷ H. S. Conrad and H. E. Jones, "Psychological Studies of Motion Pictures: III. Fidelity of Report as a Measure of Adult Intelligence," *University of California Publications in Psychology*, Vol. 3 (1929), 245-76.

³⁸ F. L. Ruch, "The Differentiative Effects of Age upon Human Learning," *Journal of General Psychology*, 11 (1934), 261-86.

TABLE XXIV

RELATION OF AGE TO VISUAL MEMORY SCORES

<i>Test A</i>		<i>Test B</i>		<i>Test C</i>	
AGE	MEDIAN	AGE	MEDIAN	AGE	MEDIAN
11.9	39.3	11.8	34.8		
12.8	45.4	12.6	38.5	12.8	42.2
13.5	48.4	13.3	42.8	13.6	42.5
14.4	49.1	14.4	46.1	14.4	45.3
15.4	49.4	15.4	48.0	15.5	47.5
16.5	49.7	16.6	49.1	16.4	46.5
17.4	50.0	17.3	50.6	17.5	47.4
19.1	51.8	19.0	51.2	18.9	50.1
20.4	52.4	20.5	51.8	20.2	50.8
23.7	51.4	23.5	54.3	23.4	50.7
28.3	50.6	28.6	52.3	28.2	48.9
32.3	49.5	32.1	48.4	32.4	48.6
37.6	50.1	36.8	47.8	37.7	49.5
42.0	50.3	42.8	48.6	42.5	49.8
46.7	47.0	48.3	46.7	46.8	47.2
51.8	42.3	52.3	44.5	50.8	42.8
55.9	35.3	55.7	40.6		

It should be added that after maturity increasing age is not without compensation. There are two factors in general that go to determine a person's ability to learn: his intelligence and his past learning—fund of knowledge and so on in the area in question. Thus it follows that in the area of his own profession a man's growth in competence which attends the active prosecution in his field may compensate to such a degree for his decline in test intelligence that he may outmatch a younger man in the learning of new facts and techniques in this field. It would seem to be true that while a man of 50 or 60 is less proficient in learning in general, this loss in proficiency does not apply to his field of specialization.

A second problem concerns the relationship between age and learning achievement with test intelligence held constant. If a significant relationship is still obtained, this would mean that some factor other than intelligence is operative, assuming that intelligence is adequately appraised.

The relationship between age and learning achievement, with test intelligence constant, may be investigated by the method of partial correlation. Upon the basis of ideal data Thorndike furnishes the following calculations:

$$r_{12.3} = -.04, \text{ in which}$$

r = correlation coefficient
 1 = age (20 to 54 years)
 2 = learning scores
 3 = test intelligence

and in which $r_{12} = -.50$; $r_{13} = -.60$; $r_{23} = .80$. These coefficients are reasonable estimates made upon the basis of empirical data from various sources. In this illustration the correlation between age (20 to 54) and learning achievement is $-.04$, when test intelligence is partialled out.³⁹ Thorndike has applied the partial correlation formula to some of his own experimental data, with a like result.

In conclusion, it may be said that the data presented above suggest that when test intelligence is held constant, learning achievement declines very little, if at all, for the age ranges under consideration. Another way of stating the matter is that persons of different ages but of like MA are approximately equal in general learning ability. What is usually meant, of course, when the question of age and learning ability is raised is: How, for example, do persons of 20 in general compare with those of 60 in general? To which the reply "The latter are inferior" is indicated. But if we are comparing men of 20 with men of 60 of like MA, we should expect them to score equally well in learning experiments in general, bearing in mind, of course, that each is not equally representative of his time of life.⁴⁰

³⁹ E. L. Thorndike, *et al.*, *Adult Learning* (New York: The Macmillan Company, 1928), Apx. VI.

⁴⁰ Cf. F. L. Ruch, "Adult Learning," *Psychological Bulletin*, 30 (1933), 387-414. (A review of the literature.); G. S. Snoddy, "Learning and Stability," *Journal of Applied Psychology*, 10 (1926), 1-36; H. Sorenson, "Adult Ages as a Factor in Learning," *Journal of Educational Psychology*, 21 (1930), 451-59; R. L. Thorndike and G. H. Gallup, "Verbal Intelligence of the American Adult," *Journal of General Psychology*, 30 (1944), 75-85.

The Counselor's Role

Obviously, taking care of individual differences in school entails a great deal more knowledge of the characteristics of a pupil than the simple fact of his deviation in school subjects. To help a pupil who has a reading problem, the teacher must know a great deal more about him than the extent of his deviation in reading. Indeed, taking care of individual differences requires a knowledge of all pupils, not just of those who present problems. Treating all pupils fairly means that they must all be treated differently and that the treatment be based upon an acquaintance with the characteristics of the individual pupil.

Writers have proposed various lists of pupil characteristics that the teacher should be acquainted with. Perhaps Hoyt's list of minimum essentials will occur to the teacher as being practical and realistic.⁴¹ He suggests that the teacher should have basic information in at least the following areas: (1) home and family background, (2) past educational experience, (3) present educational status, (4) interests and out-of-school activities, (5) peer relationships, (6) pupil self-concepts, and (7) health and physical status.

It must occur to the busy teacher that the acquisition of knowledge of these and other characteristics that may be required would be difficult indeed, and in the typical high school, next to impossible. It is much too much to expect the teacher to collect all the information required about every one of his pupils or to keep it all in his head. The teacher needs adequate records, cumulative records, in the form of handy folders on each pupil. Others must have a hand in supplying, co-ordinating, and interpreting the data. In this work the counselor occupies a key position, although he must certainly rely a great deal upon the classroom teacher for much of his information.⁴² It is not surprising that

⁴¹ K. B. Hoyt, "How Well Can Classroom Teachers Know Their Pupils?" *The School Review*, 63 (1955), 228-35.

⁴² Cf. C. P. Froelich and J. G. Darley, *Studying Students* (Chicago: Science Research Associates, Inc., 1952); M. D. and J. A. Woolf, *The Student Personnel Program* (New York: McGraw-Hill Book Co., 1953).

investigators have found that typical teachers possess only a small amount of the information about individual pupils which experts think they should have, information required if the teacher is really to do a professional job.⁴³ Moreover, it is not assumed that the typical classroom teacher has the specialized training required for the assimilation and interpretation of the information, at least not without help. In this he should expect to receive the aid of the professional counselor, the school psychologist, or some other worker.

ADDITIONAL REFERENCES

- Ashmore, S. S., *The Negro and the Schools* (Chapel Hill: University of North Carolina Press, 1954)
- Bedoian, V. H., "Social Acceptability and Social Rejection of the Underage, At-Age and Overage Pupils in the Sixth Grade," *Journal of Educational Research*, 47 (1954), 513-20
- Berdie, R. F., Layton, W. L., and Hagenah, T., *Using Tests in Counseling* (Minneapolis: Student Counseling Bureau of the University of Minnesota, 1953)
- Bond, J. A., "Analysis of Factors Adversely Affecting Scholarship of High School Pupils," *Journal of Educational Research*, 46 (1952), 1-15
- Bonney, M. E., and Powell, J., "Differences in Social Behavior between Sociometrically High and Sociometrically Low Children," *Journal of Educational Research*, 46 (1953), 481-95
- Brieland, D., "A Variation of the 'Guess Who' Technique for the Study of the Adjustment of Children," *Journal of Educational Research*, 45 (1952), 385-90
- Brown, W. F., Abeles, N., and Iscoe, I., "Motivational Differences between High and Low Scholarship College Students," *Journal of Educational Psychology*, 45 (1954), 215-23
- California State Department of Education, *Guidance in the Elementary School*, California State Department of Education, *Bulletin*, Sacramento; Calif., August, 1954
- , *Now Hear Youth. Ibid.*, Vol. 22, No. 9.

⁴³ W. Baller *et al.*, "Essential Pupil-Personnel Records," *Teachers College Record*, 48 (1947), 268-86.

- Edberg, G., *et al.*, *A Guide for the Study of Holding Power in Minnesota Secondary Schools*. Minnesota Council for the Improvement of Secondary Education, *Bulletin* (1952), No. 2, Office of the State Superintendent of Education, St. Paul, Minnesota, 1952
- Fox, W. H., and Segel, D., "The Validity of the Choice of Friends—Method of Measuring Social Adjustment," *Journal of Educational Research*, 47 (1954), 389-94
- Gough, H. G., "What Determines the Academic Achievement of High School Students?" *Journal of Educational Research*, 46 (1953), 321-33
- Greenleaf, W. J., *Occupations and Careers* (New York: McGraw-Hill Book Co., 1954)
- "Guidance, Counseling, and Pupil Personnel," *Review of Educational Research*, 24 (1954), No. 2
- Kostick, M. M., "A Study of Transfer: Sex Differences in the Reasoning Process," *Journal of Educational Psychology*, 45 (1954), 449-58
- Krathwohl, W. C., "Relative Contributions of Aptitude and Work Habits to Achievement in College Mathematics," *Journal of Educational Psychology*, 44 (1953), 140-48
- Lewis, D., McAllister, D. E., and Bechtoldt, H. P., "Correlational Analysis of the Learning and Relearning of Four Different Tasks on the Modified Mashburn Apparatus," *Journal of Psychology*, 36 (1953), 83-109
- Little, W., and Chapman, A. L., *Developmental Guidance in Secondary Schools* (New York: McGraw-Hill Book Co., 1953)
- Orr, H. K., "Measuring the Output of High Schools," *Journal of Educational Research*, 46 (1952), 305-12
- Osborne, R. T., and Sanders, W. B., "Comparative Decline of Graduate Record Examination Scores and Intelligence with Age," *Journal of Educational Psychology*, 45 (1954), 353-58
- Pennsylvania Joint State Government Commission to the General Assembly of the Commonwealth of Pennsylvania, Sixty-Five: *A Report Concerning Pennsylvania's Aged* (Harrisburg: Pennsylvania Joint State Government Commission, 1953)
- Robinson, F. P., *Principles and Procedures in Student Counseling* (New York: Harper and Brothers, 1950)
- Rothney, J. W. M., *The High School Student: A Book of Cases* (New York: Dryden Press, 1953)

U. S. Office of Education, *High-School Retention by States*, Circular
No. 398, 1954

Wentland, C. R., "Individual Differences and School Promotion,"
Elementary School Journal, 52 (1951), 91-95

TEACHER AND PUPIL

Methods and Materials

Sensory mode of presentation. This was one of the first problems to emerge in educational psychology. Indeed, in the early exploratory period of experimental psychology the problem held considerable interest for general psychology. The first volume of the *Psychological Review* carried two articles on the sensory mode of presentation. In one of these, three methods of presentation were compared: names of objects presented orally, names of objects presented visually, objects themselves presented visually.¹ In the other article the visual, auditory, and visual-auditory methods were compared.²

In a sense, as we look back upon this period in psychological history, we may be inclined to feel that the score or so of experimental investigations made on this problem yielded rather fruitless results. No very striking or unequivocal differences were obtained. However, until ascertained by investigation this fact was not known. Knowing it is certainly worth while. In this sense the research bore significant results, even though it did not generally yield significant differences.

The question of individual differences in the sensory mode of

¹ E. A. Kirkpatrick, "An Experimental Study of Memory," *Psychological Review*, 1 (1894), 602-09.

² H. Münsterberg, "Memory," *Psychological Review*, 1 (1894), 34-38.

presentation is still not firmly settled. While we can say that pupils in general can learn through one sense avenue about as well as through another, it does not necessarily follow that any given pupil can do so. From the outcomes of the discussions of image types, which attracted a good deal of attention during the first decade or so of the present century, one would be inclined to suspect, however, that individual differences in the sensory mode of presentation are not great.

(1) *The doctrine of image types.* The educational problem of the sensory mode of presentation grew out of the doctrine of image types. A person employing a predominance of visual imagery was said to be visually minded or eye-minded; one employing auditory imagery predominantly, ear-minded, and so on. Moreover, it was generally held that visually minded persons, as determined by the relatively greater richness of their visual imagery, could learn most readily when material was presented by visual means. The auditory type was alleged to learn with greatest facility when material was presented to the ear. This teaching was based upon the assumption that since learning involves the making of associative connections, it should be easier to make these connections in that sense modality in which there exists the greatest power of revival of past experience. There seems to have been the idea also that recall could be best effected by the medium of the dominant imagery. Thus the learning of material presented to the sense department in which there exists the best imagery would, by this supposition, have the greatest utility. Granting the validity of the type doctrine, it follows that the best image modality yields the most faithful recall. However, it does not follow that material should necessarily be presented visually to the visual type, or by ear to the auditory type. Thus Lay took note that in spelling, nearly all subjects utilized visual imagery in recall, regardless of the sense to which the words were presented. Abbott also observed that subjects may make easy transference from one modality to another, as is seen in the fact that materials presented to the ear, for example, may be recalled

in terms of visual, rather than auditory imagery.³ Earlier, Meumann had seen in image types a possibility of putting education upon a scientific footing.⁴

In the absence of definitive experimental data to the contrary, it is suggested that at present there is not good reason to suppose that there should be any very important systematic differences in the relative effectiveness of different sensory modes of presentation, except perhaps those dictated by habits of work. Learning appears to be accomplished by the making of certain mental reactions. One form of sensory excitation should be as satisfactory as another for purposes of eliciting these reactions. Academic learning is, or should be, featured by understanding and meaningful organization. The central processes loom large in learning. These considerations, in addition to the equivocal character of the experimental results, make it unlikely that there are in general any fundamental differences in the results of different sensory modes of presentation. However, differences in interest value and differences in development of mechanical means of presenting material—for example the perfection of the motion picture—may make one method more available than another.⁵

(2) *Listening and reading.* Young has compared four methods of presenting connected text materials in classroom situations, using as subjects elementary-school pupils of grades 4 to 6, 400 or more per grade.⁶ Fifteen different selections of material, ranging in length from 350 to 800 words, were presented by the following methods:

³ E. E. Abbott, "On the Analysis of the Factor of Recall in the Learning Process," *Psychological Monographs*, 11 (1909), Whole No. 44, 159-77.

⁴ E. Meumann, *The Psychology of Learning*, trans. by J. W. Baird (Ed. 2; New York: D. Appleton-Century Co., 1913).

⁵ Cf. F. R. Elliott, "Memory for Visual, Auditory, and Visual-Auditory Material," *Archives of Psychology*, 29 (1936), Whole No. 199; H. N. DeWick, "The Relative Recall Effectiveness of Visual and Auditory Presentation of Advertising Material," *Journal of Applied Psychology*, 19 (1935), 245-64.

⁶ W. E. Young, "The Relation of Reading Comprehension and Retention to Hearing Comprehension and Retention," Doctor's Thesis. State University of Iowa, 1930.

- A Teacher read aloud to pupils.
- B Teacher read aloud, pupils followed by reading silently.
- C Pupils read silently at their own individual rate.
- D Pupils read silently for a length of time equal to that required by their teachers to read orally.

Learning was assessed by means of objective tests administered immediately after the presentation of the material. Four groups, equated on the Gates Reading Test, were formed in each grade. Both the order of presenting the selections and the order of the methods of presentation were cross-checked or counterbalanced.

Reliability coefficients of the tests ranged from .61 to .88. Correlations of about .60 were obtained between the scores earned when the materials were read by the teachers and those earned when read by the pupils themselves. Comparisons of the effectiveness of methods A, C, and D, for which complete data were obtained, may be made from Table XXV.

TABLE XXV

SCORES IN PER CENT OF MAXIMUM FOR THREE METHODS
OF PRESENTATION

<i>Material</i>	<i>Grade</i>	<i>Listening</i>	<i>Reading (own rate)</i>	<i>Reading (for time equal to listening time)</i>
Natural Science	4	33	25	29
" "	5	41	35	41
" "	6	46	41	44
Poetry	4	23	20	22
" "	5	36	32	31
" "	6	37	31	34
Hero	4	27	23	24
" "	5	40	35	37
" "	6	49	44	..
Industrial	4	21	18	18
" "	5	32	24	32
" "	6	40	37	39

Young concludes that the differences are small and usually lacking in statistical significance. It is worth noting, however, that the

method of auditory presentation proved to be somewhat superior to the other two with marked regularity. Further data are given presently in connection with the discussion of the lecture method. Young's results are in accord with those of earlier investigations conducted by Russell and Erickson and King.⁷

The lecture method of instruction. In general, there are two methods of attacking this problem. One method compares learning from lectures with learning by some other method—for example, reading—when the content of the materials of learning is the same. This method lends itself to reasonably rigid control and when put in this form, the problem is in effect continuous with that discussed under *sensory mode of presentation* and *reading and listening*. A second method yields less readily to experimental control, but attacks a more significant aspect of the general problem; namely, that of comparing the lecture method with other methods of conducting classes, such as class discussion, the use of conferences, and the like, in which the content of the material is admittedly different. Does some one method make feasible a better choice of content or a superior method of treating it? After all, we are not so much concerned about how the various methods of teaching compare when all conditions except the mode of presentation are equivalent, as we are in the variations that the different methods permit and the comparative effectiveness of these variations.⁸

It seems doubtful if any generally useful statement can be made about the relative effectiveness of the lecture method and the various forms of class discussion, since so much depends upon the lecturer and the quality of the discussions, as well as upon the

⁷ R. D. Russell, "The Relative Effectiveness of Presenting Verbal Material Visually and Orally as Measured by the Amount of Recall," Doctor's Thesis. State University of Iowa, 1923; C. I. Erickson and I. King, "A Comparison of Visual and Oral Presentation of Lessons in the Case of Pupils from the Third to the Ninth Grades," *School and Society*, 6 (1917), 146-48.

⁸ E. B. Greene, "The Relative Effectiveness of Lecture and Individual Reading as Methods of College Teaching," *Genetic Psychology Monographs*, 4 (1928), 457-63; S. M. Corey, "Learning from Lectures vs. Learning from Readings," *Journal of Educational Psychology*, 25 (1934), 459-70.

subject or the course of study.⁹ There is nothing to be found in the published research or in common sense to dissuade a teacher from using the method he likes best.

Audio-visual teaching aids. As a psychological problem the question of the value of visual aids is not continuous with that of the sensory mode of presentation. The content of films, slides, and still pictures is ordinarily not capable of being presented orally in anything like equivalent form. Indeed one of the chief values of such visual media of instruction lies in the fact that they make possible the presentation of content not so readily presentable by verbal means. There is also a large human-interest factor in good films and still pictures.

Today we have literally thousands of educational films, film-strips, slides, and other projective and nonprojective teaching aids. The rental and purchase of these educational aids, together with procurement and maintenance of the necessary equipment and the securing of advisory personnel, comprise a major division of our larger public school systems. There is little doubt as to the educational value of these materials and services. How do these media supplement the teaching and learning processes? We must look beyond the thought that two senses are better than one, which is questionable anyway. Two senses are not better than one if we are dealing with words. A word is a visual, an auditory, or a kinesthetic stimulus, or all three; but it is the same word with the same meaning.

One of the fine things about pictures is that they are not words. Sometimes they supplement words; sometimes they are supplemented by words. With enough words one could adequately describe almost anything that can be shown in a picture. If you

⁹ Cf. R. B. Spence, "Lecture and Class Discussion in Teaching Educational Psychology," *Journal of Educational Psychology*, 19 (1928), 454-62; H. H. Remmers, "Learning, Effort, and Attitudes as Affected by Three Methods of Instruction in Elementary Psychology," in *Studies in Higher Education*, XXI, *Purdue University*, 33 (1933), No. 6; D. H. Cook, "Two Experiments in Learning Educational Statistics," *Journal of Educational Research*, 26 (1922-23), 674-78; G. Watson, "An Evaluation of Small Group Work in Large Classes," *Journal of Education*, 44 (1953), 385-408.

wished to describe an adz, a ponderosa pine, or an aardvark, you could do so in words, given enough words and enough time. How much more conveniently can this be done with pictures! One of the things that has plagued teachers from the beginning is excessive verbalism in school. As will be illustrated presently, pupils often learn words and recite in words learned in their lessons without much comprehension. Pictures, still pictures and motion pictures, help to overcome this practice. Incidentally, it is always a question of when to use motion pictures and when to use still pictures. Ordinarily there is no particular advantage in motion unless motion is involved in the object being pictured. If we wish to study squirrels, we may need motion pictures; if our subject is trees, we may do as well with still pictures. There may of course be a convenience in the motion picture. We can thread the film in the projector and simply let it run.

Obviously, one of the principal reasons for so much verbalism in school is lack of adequate background experience. Recognition of this was probably the chief justification for "preparation" in Herbart's "five formal steps," which dominated education for so long a time. We have seen expressions of this movement in "taking the child into the garden," modeling, constructive activities (to be discussed presently), and in the field trip or the school journey. It is also seen in the practice of utilizing community resources in teaching. The educational film is widely used today for this very purpose. No one would doubt that it is preferable, educationally, to see firsthand cotton ginning, codfishing along the St. Lawrence, or the lumber industry in Oregon. Such places lie beyond the reaches of the school journey, but not beyond those of the producer of education films.

There is the further fact that we can in some instances obtain a better story from the film than we can from unaided observation and certainly can do so in less time. This is true because the photographer may have studied the subject carefully in advance and learned what is important in telling his story. He also knows how to focus the attention of the viewers of his pictures. Then there are slow motion, animation work, the speed-up, and so on.

Thus we can see plants grow. We can see the circulation of blood, and many things we could not see at all for ourselves without these aids.

The effective use of audio-visual teaching aids is a subject by itself. There are several very useful books bearing upon this subject.¹⁰ These aids can be used in introducing a unit of instruction—to arouse interest, to provide preliminary information, to raise questions for study. They may be used at any point in the development of the unit for supplementary purposes. They may also be used for purposes of summarization after study. There is a great deal more to this than simply getting a film and showing it. For example, in many instances the pupils should be “prepared” for the seeing of a film. The skillful use of audio-visual aids is one of the things meant by “the art of teaching.”

The effectiveness of one or more presentations. Naturally, a general answer cannot be given to this question. Much, indeed nearly everything, will depend upon the learner, the material, and the rigorousness of the tests employed in assessing the learning. A pupil can be made to appear to learn much or little according as the test is easy or difficult.

While it is impossible to say how much is learned as a result of one or more presentations, it is possible, of course, to determine the percentage of correct answers made on a criterion test. The usefulness of this determination will depend upon the adequacy of the test. It is possible to secure a fair amount of agreement as to the facts and meanings pupils should get, ideally, and to ascertain by practical measures how closely the pupils approximate this ideal.

Yoakam addressed himself to this problem in a systematic investigation of the effectiveness of a single reading and of two consecutive readings of various types of material common to the

¹⁰ J. S. Kinder and F. D. McClusky, *The Audio-Visual Reader* (Dubuque; Wm. C. Brown and Co., 1954); E. Dale, *Audio-Visual Methods in Teaching* (New York: Dryden Press, 1954); M. East and E. Dale, *Display for Learning* (New York: The Dryden Press, 1952); R. De Kieffer and L. W. Cochran, *Manual of Audio-Visual Techniques* (New York: Prentice-Hall, 1955).

elementary school.¹¹ The subjects, pupils in grades 4 to 8, were engaged in reading prose selections ranging in length from 110 to 1900 words. The materials were selected from geography, history, nature study, economics, and language. The principal guiding factor in their selection was that of securing materials that were common to the elementary grades. The effect of the readings was assessed by objective tests. The test questions allegedly covered the important ideas contained in the reading material. As evidence of the extent to which such results are influenced by the character of the material and the nature of the tests, is the fact that the averages (in percentage of correct responses) varied from 15.5 to 78. Yoakam's results on the effectiveness of a single reading are summarized by him as follows:

The effect of a single reading of content material varies with the individuals, but on the average it is less than half of the total ideas in the article read and it often falls to a third or less.

Individuals vary so much in their abilities that it is not safe to conclude that there are not some people who can read an article once and practically remember its entire contents. There are a fortunate few who would be as efficient after a single reading as others might be after severe study.

Perhaps it should be noted that if the test is rigorous enough to discriminate among the ablest pupils and easy enough to discriminate among the poorest pupils, the showing of the student of average ability must necessarily be mediocre. This result is produced in part by experimental arrangement. But these differences must exist or else the test could not reveal them.

There can be little doubt that the typical student learns a comparatively small amount of what he reads, hears, or otherwise perceives, or that the poor student learns little indeed.

Yoakam also compared the effect of two consecutive readings with the effect of but a single reading. Two equated groups of

¹¹ G. A. Yoakam, "The Effects of a Single Reading," University of Iowa: *Studies in Education*, 2 (1924), No. 7. See also his *Reading and Study* (New York: The Macmillan Company, 1928).

pupils, grades 7 and 8, were formed for this comparison. Those of one group read the material once; those of the other group were given two consecutive readings. The former achieved a median percentage score of 30.5, the latter, a score of 32.8, on immediate recall.

Yoakam's results regarding the effect of a second reading imposed immediately after the first are confirmed by the findings of Good, published a year later.¹²

An investigation of the effectiveness of a second presentation of a sound-picture educational film has been conducted by Loats. This condition of his investigation was designed to parallel the conditions of Yoakam's and Good's experiments. One group of eighth-grade pupils observed in a single showing the film *Territorial Expansion of the United States from 1783 to 1853*, and eight days afterward took an objective test on the content of the film. A like group observed it in two consecutive showings and took the test eight days later. The mean score earned by the first group was 13.25; by the second group, 13.62.

Such results do not justify a second presentation of material like the first immediately afterward. Generalization beyond these conditions is not warranted. Doubtless there are ways of increasing the efficiency of educational films, over and above a single presentation. The same is true of reading. A second presentation like the first without any intervening preparation does not seem to be among them. There are so many arguments against repetitive practice wherever understanding, generalizing, and concept-forming are involved as to make it highly probable that our attention should not be directed toward increasing the effectiveness of a second or third reading but toward a more fruitful line of attack, such as that suggested presently in connection with *extensive reading*.

One method that has been worked rather systematically in reading, and which was also employed by Loats, is the securing of a

¹² C. V. Good, "The Effect of a Single Reading Versus Two Readings of a Given Body of Material," *Journal of Educational Method*, 5 (1926), 325-29.

test response immediately after a presentation, even without a subsequent second presentation.¹³ Without exception, to the writer's knowledge, this method has proved, by substantial and significant amounts, to be superior to a second presentation. This procedure is discussed further in a later context.

Are our schools or our natures at fault? It is easy enough to criticize our schools. Pupils do not learn enough, it is said, and, by implication, they could learn a great deal more. Pupils learn and remember very little of their lessons. The facts of everyday observation substantiate this, as do psychological experiments like those recounted above.

Is this the fault of the school? The human learning apparatus is imperfect; that of some, of course, is vastly superior to that of others, but that of all is imperfect. It would be much fairer to appraise the pupil's accomplishment not by how much of some maximum amount he learns, but by comparing his learning with that of the rest of us. It is a fact that comparatively little of all the vast and colorful kaleidoscopy that passes before our senses makes any lasting impression in us. We see and hear but little of that which is visible and audible, and most of that which we do see and hear is not remembered.

If we can produce a small increase in amount learned per hour, and the difference between the poorest and the best method of learning per effective unit of time is not numerically great, the aggregate effect, at the end of a school career, will of course be tremendously important.

Intensive and extensive study. By *intensive study* is meant the reading, rereading, and intensive study of a textbook or some similar source; by *extensive study* is meant wide reading and the gathering of information from various sources. The teacher must face this issue every time he makes an assignment. He cannot avoid it however much he tries.

For a number of reasons the deciding vote should go to the extensive method. The aim of mastering the textbook, which is com-

¹³ H. A. Loats, "The Effect of One and Two Showings of Educational Films," Master's Thesis. State University of Iowa, 1942.

monly associated with the intensive method, is of course a worthy one. But a textbook cannot be "learned well" in the way some teachers suppose. Its content cannot be mastered by reading and rereading. Of course we do not really expect mastery anyway, but to make a good start the pupil must read widely.

Reading and rereading a book does not lead to mastery. The gain from a second or a third reading is usually exceedingly small, as just noted. Here we see the folly of inviting a student who complains that he did not get much out of his assignment to read it again. And in view of the range and variety of material available today on almost every subject in the curriculum, we may surmise that this is our most unpardonable practice. It is, of course, true that all but the very exceptional students fail to learn from a single reading anything like all the facts, ideas, and concepts contained in an assignment. It does not necessarily follow, however, that this is a justification for having the pupils read it again. First, the gain from a second reading is very small, as a general thing, and second, there are better procedures.

Textbooks are best used as outlines or guides rather than as the chief source of learning. The writer of a textbook labors under certain serious handicaps. In order to serve as a sufficient book for a course of study, the text must treat a variety of topics. And in order to keep it from becoming so large as to be impractical, the author must present much of the material in a highly condensed and abstract form. In order to see the significance of this, let us bear in mind a point made earlier; namely, that the pupil must form his own ideas and concepts. These he forms in part by the help of the book and in part—and much the greater part—by the help of his background of experience. It is true that the author formed his concepts by the help of the very words found in his text. But the immature pupil simply lacks the necessary background from which to form these same concepts. Students must gain this background from wide reading, from field trips, from listening to their teachers, and from other sources of experience.

What we teachers are really interested in is the gaining by our

students of understanding and appreciation—that is, general knowledge that is independent of the phraseology of a particular book. The test of the student's having arrived at this goal is his ability to state his learning in his own words. Perhaps we may profit from a glance at the conditions of concept formation. A child does not get a mature concept of "father" just by knowing his own patriarch. He comes by a general concept of "father" by wide experience in many different situations. By the same token it may be said that a pupil attains safe and useful generalizations in a field of knowledge by wide experience. It is only by seeing things in their various relationships that he gains a mature appreciation of them.

Wide reading, in which things are seen in a variety of relationships, is more likely to lead to mature and dependable understanding than is intensive reading and study of a single source, even when the total time spent is the same. A mature concept of anything is attained by breadth of experience rather than by intensive experience with some one aspect of it. It is difficult to see how intensive study of a textbook can yield full, rounded, generally useful knowledge. One does not gain mastery of a language by reading and rereading some one work in that language. To gain a dependable knowledge of vocabulary, idiom, syntax, and so on it is necessary to read more widely.

Breadth of experience also secures the right degree of generalization. It guards against overgeneralization and also against forming concepts that are not sufficiently general. These two conditions—overgeneralization and undergeneralization—are serious limitations to understanding.

Extensive study should not be confused with superficiality. It should be the manner of investigation that is extensive. Indeed, thoroughgoing extensive study leads to thorough learning. Conversely, rereading and intensive study of an assignment, if it must be accomplished at the expense of wide reading, encourages verbalism in learning, memorization. Wide reading, wide acquaintance, is our best insurance against it.

The problem of extensive-intensive study has proved difficult to conceptualize for purposes of research. This is not the kind of problem that lends itself readily to investigation by the use of a few short samples of learning material. Perhaps it could be attacked profitably in a course of study in which a number of classes were taught according to the two programs. Even here the outcome would depend a great deal upon the adequacy of the criterion tests. They should be highly functional in character, testing not only knowledge of facts, but also understanding, and ability to draw inferences, to form judgments, and to make applications. One thing we wish to know is how the two methods of procedure compare when the amount of time devoted to study and investigation is equal. Another is their comparative effect upon the student with respect to interest, effort, and the amount of time he is willing to devote to a subject. Existing research supports the extensive approach.¹⁴

Constructive activities. The problem of significant learning—learning that has significance to the learner—has plagued education since Locke's day, at least. Without doubt American schools today are farther removed from the memoriter and catechetical methods than at any time in our history. Locke took occasion to deride the schoolmasters of his day for their insistence upon excessive memory work. Our own schools were pretty much dominated by this kind of instruction down to the end of the last century, instruction which was all the worse because the pupils so little understood what they had thus laboriously learned. Slade supplies an instructive example of this kind of learning. In a certain class in geography (1882) the teacher asked the questions, as was typical of that day, and "the pupils gave, with considerable

¹⁴ F. D. Curtis, "Some Values Derived from Extensive Reading of General Science." Teachers College, Columbia University, *Contributions to Education*, No. 163, 1924; N. G. Coryell, "An Evaluation of Extensive and Intensive Teaching of Literature." Teachers College, Columbia University, *Contributions to Education*, No. 275, 1927; C. C. Crawford and W. L. Walker, "An Experiment in Teaching History Backward," *Historical Outlook*, 22 (1931), 395-97; R. S. Rice, "Extensive Reading Versus Intensive Textbook Study as a Means of Acquiring Knowledge of Scientific Facts and Principles," *Journal of Experimental Education*, 4 (1936), 376-402.

gusto, the answers given in the book." To the question "Which is the most populous of the Western states?" the pupils replied without hesitation, "Ohio is the most populous of the Western states." When asked by Slade what the word *populous* meant, there was confusion and embarrassment. A similar result was obtained when the pupils were asked to explain "heights commanding Washington," after the sentence "It was feared the rebels would obtain possession of the heights commanding Washington" had been rendered in a history class.¹⁵ Here we have illustrations of the learning of pat answers in response to stock questions, with little regard to the understanding of what is learned. This is the catechetical method at its worst.

A friend of mine, visiting a school, was asked to examine a young class in geography. Glancing at the book, she said: "Suppose you should dig a hole in the ground, hundreds of feet deep, how should you find it at the bottom—warmer or colder than on top." None of the class replying, the teacher said: "I'm sure they know, but I think you do not ask the question quite rightly. Let me try." So, taking the book, she asked: "In what condition is the interior of the globe?" and received the immediate answer from half the class at once: "The interior of the globe is in a condition of igneous fusion."¹⁶

This method has probably never been without its critics. Herbart's elaboration of Locke was a specific against this form of teaching, although many of his followers fell into the evils of formalism almost as inimical to significant learning as the evils he sought to correct. The "back to nature" movement of Rousseau (1712-1778) seems to have been motivated by the desire to correct the evils of mere verbalism inherent in the memoriter method.

The child garden of Pestalozzi (1746-1827) seems to have been a wiser approach. The latter's method of taking the school to the garden was the forerunner of the method of bringing the "garden" to the school; namely, the object-lesson method, as launched by

¹⁵ J. P. Slade, "Country Schools," National Education Association, *Proceedings*, 1882, pp. 21-23.

¹⁶ W. James, *Talks to Teachers on Psychology: and to Students on Some of Life's Ideals* (New York: Henry Holt and Co., 1916), p. 149.

E. A. Sheldon at the Oswego Normal School about 1860.¹⁷ While this method had the worthy aim of avoiding the meaninglessness of mere verbalistic learning, it did not prove to be a cure-all. Without previous knowledge objects may be about as meaningless as words, although no one would doubt there is educational value in seeing and examining objects that are being studied. On the practical side, the object-lesson method, and the use of maps, modeling, and sand tables, fell into evil ways also. Critics complained that much of the instruction based upon their use lacked significance to the learners. The method was overdone. Instead of being used as an aid to teaching it became in many schools an end. Some critic observed that if they wished to teach a pupil to come out of the rain, "they must have a watering pot and a rag-baby to show the effect of the shower."¹⁸

Perhaps one of the most successful procedures for infusing learning with significance has been constructive activities. While this method bears considerable similarity to the object-lesson method and the mapmaking and modeling of the latter part of the last century, and to an extent had its origin in these methods, it differs from them in certain important ways. It is constructive rather than imitative. It is directive in the sense that it guides the learning activities of the pupils. The activities, while they may appear to the pupils to be the ends that justify the means, are really the articulating centers of a great deal of work and study. The particular activity is thus a means of making learning meaningful and of giving it a purpose. It is also a very important means of socializing the work of the classroom.

The constructive-activity movement was given form and direction by Parker and Dewey about the beginning of the present century. It became rather well established in American schools by the 1920s. This movement will be discussed in some detail pres-

¹⁷ N. H. Dearborn, "The Oswego Movement in American Education," Teachers College, Columbia University, *Contributions to Education*, No. 183, 1925.

¹⁸ From F. A. Anderson, "A Description and Evaluation of the Constructive Activities Used in Teaching the Social Studies from 1880 to 1930," Doctor's Dissertation, State University of Iowa, 1934.

ently. Suffice it to say here that it easily stands as the most significant movement in education in our times. While it has found its greatest expression in the elementary school, some of its elements are found in the high school, notably in connection with the laboratory method of teaching the sciences, and the project method.

Guided Learning in School

The assignment. The problem-solving character of learning and thinking should be fully appreciated. In a sense, all mental effort starts with and is directed by a problem. Even in the simplest aspects of perception, a person does not just perceive something, but perceives it in relation to some act of adjustment, some problem. The same is true of reflective thinking. The problem is the reason for thinking; and the course of thought is directed by the nature of the problem as it is perceived or felt. *Learning does not begin without a problem*, and the nature of the learning act is directed by the nature of the problem, even when it is no more specific than the general problem of getting one's lessons. But if it does not become more specific than this, the pupil may experience difficulty in concentration and complain about not knowing how to study.

There is no mystery about studying. It is noteworthy that we do not feel called upon to instruct the youth in how to read an account of a football game, or teach him how to learn to construct a model airplane. Given appropriate instructions about a project, he knows how to learn their contents and to follow their directions. We do not exhort him to concentrate, to have a purpose, to assume the same posture each time he reads the instructions, or to go to the same place, or to have a definite time for reading them, or to spend a certain portion of the time reading and a certain portion in applying what he has read. All such instruction seems insignificant beside the fact that he has a job to do and is interested in doing it. He is reading and studying for a purpose. *He has a problem.*

The task of helping a pupil find a suitable problem is no easy matter. The problem must be worth while from the standpoint of instruction, as well as interesting. This task often amounts to leading the pupil to accept a problem as being worth his while.

When the pupil becomes interested in working out a problem, learning becomes a means to an end. Then learning is directed, as it should be, by the motive-incentive conditions of the pupil. The problem need not be in itself one of intrinsic interest, but the carrying-out of the project should satisfy some fundamental interest. In all this the teacher has the basic purpose of providing important learning experience. In carrying out the project the pupil gains this experience; and the purpose, the end, guides the learning activities—makes them meaningful and purposeful. The pupil can appraise his own work to the extent that it contributes or fails to contribute to his guiding purpose.¹⁹

Provision for individual differences need not mean a separate problem for each student. When the nature of the work is such as to permit it, it seems more desirable to engage a class in working at a problem as a social unit. The part that a particular student may contribute to the working-out of the problem depends upon his talent. But the class should, ideally, have a single goal, and should co-operate in the spirit of mutual helpfulness toward reaching it. Extreme individualism is inimical to the fostering of a sense of belonging, so important to the pupil's sense of security.

There are various ways of setting a socialized goal for a class, and there is more than one *good* way of doing so; but it is suggested that the co-operative-assignment technique has certain natural advantages. Before students are ready to undertake the

¹⁹ The unit plan gives the teacher an advantageous start in planning a project. From the standpoint of giving direction to learning, the unit plan is one of the great contributions to teaching method. There are several excellent treatments of this topic to be found in textbooks in educational methodology, notably J. G. Umstattd, *Secondary School Teaching* (Boston: Ginn & Co., 1937); Chaps. VI-IX; R. O. Billett, *Fundamentals of Secondary-School Teaching* (Boston: Houghton Mifflin Co., 1940), Chaps. XVI-XVII; N. L. Bossing, *Progressive Methods of Teaching in Secondary Schools* (Boston: Houghton Mifflin Co., 1942), Chaps. VII-VIII; W. H. Burton, *The Guidance of Learning Activities* (New York: D. Appleton-Century Co., 1944).

execution of an assignment, and even before they are ready to consider specific assignments, there should supervene a period of general discussion, the purpose of which should be to delineate and vitalize the problem or unit of work. When the problem is thus defined, the students will know what they are about; and when it is vitalized or made important, they should experience a sense of security and satisfaction as they work at it.

There seems to be a good chance that the pupils will, in the first place, have greater interest in a task in the planning of which they have had a share than in a teacher-imposed task. A second and more important advantage in the co-operative assignment is the socialization of the classroom. Pupils like to talk and work together. In the third place, the co-operative planning of an assignment gives the teacher a better vantage in determining when the pupils are ready to begin work on a problem. As Horn has said, a pupil is ready to go to work on a problem when, and only when, he can state it clearly. Thus as the students talk over a problem, the teacher is in a position to judge when they have the objectives sufficiently well in mind to begin work.

When an assignment is properly made, the question of the proper balance between *teaching facts* and *teaching pupils to think* is largely outmoded. A pupil should be expected to learn such facts—and only such facts—as are necessary to a mature consideration and understanding of the issue to which the facts relate; and he should be expected to learn them only for the purpose of gaining such understanding. When this is done, there is no serious question of knowing which facts to learn. There is no danger of learning too many facts, or facts that do not apply. When one starts with a *problem* the danger is rather that there will not be enough time or enough resources for the learning of all the facts necessary to an adequate consideration of the problem in question.

The examination. Another way in which we guide the learning and thinking of our pupils—although one that is not always thought of as means of guidance—is the examination. The type of thing for which the student is rewarded or held to account neces-

sarily influences the way in which he prepares his lessons. It is not at all uncommon for us to lose sight completely of our noble and well-defined objectives when we go to make out examinations. There are but few courses of study in which there are not found the objectives *appreciation* and *critical thinking*. However, when it comes time to bring the pupil to a reckoning on his work there is reason to suspect that the teacher as test maker scarcely knows the teacher as curriculum maker. All the worthy objectives seem to be lost sight of. When students are repeatedly examined, as they are by a poor type of true-false tests, on knowledge of incidental, and often unimportant, detail, it is to be expected that the full usefulness of the examination as a directive device is not being realized. The making of good objective examinations is hard work and certainly is not to be accomplished by copying sentences out of the textbook and inserting the word "not" at appropriate places in about one-half of them.

There are few techniques at the teacher's command that give him as much control over the study activities of his pupils as does the examination. The examination is not merely a testing device. It is an important directive device. When this one of its features is fully appreciated, its use for this purpose may be considerably facilitated.

Perhaps the learning value of a good examination has never been fully appreciated. Here let us not think primarily of the preparation, in the form of study, organization, and review, for an examination, but rather of the learning that accrues from the sheer writing of the examination. In the first place, the taking of a good objective test provides excellent conditions for review, as the work of Sones and of Spitzer has shown.²⁰ Incidentally, the review value of taking such a test diminishes with the passing of time. Presumably, if the tester were to wait until most of the material had been forgotten, the test would possess little review

²⁰ A. M. Sones and J. B. Stroud, "Review, with Special Reference to Temporal Position," *Journal of Educational Psychology*, 31 (1940), 665-76; H. F. Spitzer, "Studies in Retention," *Journal of Educational Psychology*, 30 (1939), 641-56.

value. A good test may also provide excellent conditions for the exercise of critical thinking. It is probably not extravagant to say that the contribution made to the student's store of knowledge and ability in critical thinking arising from the examination is as great, minute for minute, as it is from any other learning enterprise.²¹

Certainly this is not the place to enter into any general discussions of tests. Perhaps nearly every teacher administers tests of some kind, so that it may be justifiable to raise two or three questions of the most elementary sort. How difficult should a test be? If the object of the examination is to rank pupils for the purpose of assigning marks and the like, it can be said that the average score on the test should be about 50 per cent of the maximum score. When this happens, the test should be difficult enough to discriminate among the best pupils and easy enough to discriminate among the poorest ones. If the object of the test is to determine for purposes of providing additional instruction, which pupils, if any, have not mastered certain minimum essentials, this rule does not hold. In such a case there is no objection to having 100 per cent making perfect scores. What should be the form of the item? Designers of commercial tests have largely adopted the multiple-choice or best-answer type of item. This form of item puts the pupil in the favorable position of having to choose the best response of those available, without the necessity of deciding whether or not any of them are really true or false. In the multiple-choice item all—or at least most—of the responses in an item

²¹ As just suggested, the making of good examinations is not an easy task. This is true of any type of examination, but is particularly true of the objective type. At least a poor objective examination is more serious. If essay questions are poor, the student may still have some chance to show what he knows. This is not the case with objective examinations. There are several excellent books on educational measurement. The student is referred especially to the following: E. F. Lindquist, ed., *Educational Measurement* (Washington: American Council on Education, 1951); L. J. Cronbach, *Essentials of Psychological Testing* (New York: Harper and Brothers, 1949); H. A. Green, A. N. Jorgensen, and J. R. Gerberich, *Measurement and Evaluation in the Elementary School* (New York: Longmans, Green and Co., 1953).

should have some degree of plausibility. If a response is rejected by everyone, it is not functioning in the test.

How can we tell whether or not our items are really any good? There is one simple rule that is fairly satisfactory. To be useful in a test, an item must discriminate among the members of a class in terms of their proficiency in the subject. For ordinary purposes of classroom procedure it is sufficient to compare the percentage of the best 25 per cent of the class passing an item with the percentage of the lowest 25 per cent passing it. Obviously, if the two percentages are somewhat equal, the item is not discriminating between the two groups. Perhaps there should be a minimum difference of 20 to 30 percentage points. If the class is small, it would be desirable to pool the results of two or three classes—several, if possible. How does the teacher ascertain the best fourth and the poorest fourth in a class? If there is reason to believe that the test as a whole possesses validity, the groups can be established on the basis of total scores. This might be weighed against the teacher's judgment. After the teacher becomes familiar with the pupils in a class, it should be possible for him or her to pick out a group of good and poor students with considerable accuracy. It should be remembered that all tests possess some degree of unreliability. Among other things, this is a function of the length of the test. Other things being equal, short tests are less reliable than long ones. The teacher should not be surprised if on a series of short tests there occurs considerable shifting in rank-order position of the pupils.

Too much cannot be said about the quality of the test item. Not only do good items give us better tests, but they also have more desirable psychological effects upon the student. He should respect the test. This is not likely to happen if he discovers that he can eliminate most of the foils because they do not make much sense and thus choose the correct response because it is the only plausible one presented. The novice runs the risk of giving away the answer by his phraseology or by grammatical and syntactical construction. Certainly a pupil would require no more than a little sense of grammar to mark the following item correctly:

Most normally green plants lose their color when a. through their stomata, b. contracts into a rounded mass, c. grown in the dark, d. are now extinct, e. the formation of a reproductive body.²²

There are those who at best regard the examination as a sort of necessary evil. They say it encourages undesirable study habits; that it does not place the emphasis properly; that students should be motivated to get an education instead of working for marks. This sounds like fuzzy thinking. Earning good marks and getting an education should be one and the same thing. If a student who works for marks misses an education in the process, the result is, of course, deplorable. But this is not inherent in marks. If a student can earn a good mark only by making progress in obtaining an education—making progress in the direction of all the objectives of the courses of study—then working for marks would at least seem to be harmless.

There are, however, some objections to the unbridled use of marks as motivational devices, even when the marks are based upon good examinations. Good examinations can be abused. Perhaps the most serious objection is that marks are highly individualistic and largely devoid of socializing value. For a number of reasons it is important that the social spirit be kept alive and fostered in the classroom. There should prevail a spirit of mutual helpfulness. While wholesome rivalry is not incompatible with the spirit of group welfare, intense individualism and rivalry are incompatible with it. An arrangement for giving a class a mark as well as, or rather than, individuals might help to preserve a social spirit.

The recitation. The recitation should not be regarded as a period for hearing the pupil recite, though the history of the term itself suggests that. The thought that all the learning and thinking have already taken place and that the purpose of the recitation is merely to allow the pupil to give an account of himself has no place in modern education.

²² H. E. Hawkes, E. F. Lindquist, and C. R. Mann, *The Construction and Use of Achievement Examinations* (Boston: Houghton Mifflin Co., 1936), Chapter II, III.

Much is to be said for the socialized recitation in which the teacher and pupils converse with each other about the problems under investigation. However, by all means it is the substance and not merely the form that counts. Teachers should shun the idea that there are but two kinds of recitation: on the one hand, socialized, and, on the other, catechetical—the asking of sterile questions and the receiving of pat answers memorized from books. No doubt there are socialized recitations in which pupils talk and argue glibly about things of which they know little or nothing, and these that are just as sterile as the recitations of the schoolmasters of old. The minimum essential of a good recitation is that some first-class thinking and learning occur. Everything depends upon the kind of questions raised and the quality of answers expected and demanded. It does not necessarily follow that a class is being well taught merely because there is a lot of discussion. All depends upon what is discussed, and how well.

Other things being equal, there appears to be some advantage in the socialized recitation. It provides for interlearning; that is, learning one from another—one of the most natural and effective forms of learning. If the English teacher could teach English with the ease with which his pupils pick up expressions from each other, he would think the millennium had arrived. The socialized recitation capitalizes on the natural social tendencies of pupils to talk and interchange ideas. It can be made the means of cultivating many desirable social qualities, such as respect for the opinions of others, restraint in taking a position and stating an opinion, co-operation and sharing in the working-out of problems, and skill in getting on with others who hold different views. But whatever the form of the recitation, the teacher's role is the same: that of maintaining high standards, of making sure the problems are worth while, and that the students have valid reasons for their statements.²³

The recitation requires the highest type of pupil participation. It should be understood that pupils are to be disciplined, just as in the co-operative assignment. In both instances some pupils

²³ Cf. Bossing, *op. cit.*, Chap. XV.

talk when they have nothing to say; they argue about things they know little or nothing about. This is not good teaching, but the cultivation of bad intellectual habits. There should of course be a tolerant attitude on the part of both teacher and pupils, especially toward the pupil who has done the best he can, but this tolerance should not extend to giving social approval to unbridled talking. Well-controlled discussions provide good training. Pupils should learn to differ with each other gracefully, but should be restrained from making extravagant claims, from drawing conclusions without investigating the facts. The spirit of discussion should be that of arriving at the best possible answer, not that of winning an argument. The teacher's role in managing group discussions so that these benefits are realized is enormous, and usually makes the difference between realizing them and failing to do so. It should not be thought that the pupil has concluded his contribution to a discussion when he has made a single statement or asked a single question. He should be held responsible for continued participation; but he does not have to talk in order to participate in a recitation. He can do so by listening and thinking.

The teacher's role. In any and all procedures for directing the learning activities of pupils the teacher's role is vital. Here are two examples of this, one in arithmetic and one in social studies.²⁴

MULTIPLICATION WITH TWO-FIGURE NUMBERS—

A Lesson for Giving Pupils Understanding of Multiplication Procedures (Grade 5)

This lesson was begun with these teacher remarks: "For our first work in arithmetic today, will you find the products for these examples?"

The following examples were written on the blackboard:

46	14	41	63 and	29
<u>×21</u>	<u>×32</u>	<u>×24</u>	<u>×17</u>	<u>×23</u>

²⁴ Supplied by H. F. Spitzer from his notes on observation in the University of Iowa Laboratory School.

As the pupils went about their work, one pupil (Bill) was asked to show the solution for the first example on the blackboard. When this had been done, most of the pupils had finished the first two examples and some few had finished more.

The teacher then said, "Let's stop work with pencil and paper now. . . . Most of you would probably agree that Bill's product is the correct one, but if you wanted to be certain, what would you do?"

When "Check it" was given, the teacher said, "That's a good suggestion," and then added: "You know that one of the best ways to check a solution is to do it in other ways. Suppose you check the solution for 21×46 by using at least two other solutions. If you have time, check with other solutions your products for the other examples."

The teacher went about the room discussing with individual pupils the solutions they were using. After a bit, she had three different pupils put their solution on the board. She put on the board a fourth solution that she had observed on one pupil's paper. These four other ways of solving 21×46 were put on the board.

$\begin{array}{r} \text{(a)} \quad 21 \\ \times 46 \\ \hline 126 \\ 84 \\ \hline 966 \end{array}$	$\begin{array}{r} \text{(b)} \quad 46 \\ 46 \\ + 46 \\ \hline 138 \\ 138 \\ \hline 966 \end{array}$	$\begin{array}{r} 138 \\ 138 \\ 138 \\ 138 \\ \hline 966 \end{array}$	$\begin{array}{r} \text{(c)} \quad 46 \\ \times 10 \\ \hline 460 \\ 460 \\ \hline 966 \end{array}$	$\begin{array}{r} \text{(d)} \quad 46 \quad 46 \\ \times 10 \quad \times 11 \\ \hline 460 \quad 46 \\ 46 \\ \hline 506 \\ 460 \\ \hline 966 \end{array}$
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When these four solutions were on the board, the teacher suggested that attention be given to them. In the discussion with reference to solution "a" the teacher asked, "How do you know that 46×21 will give the same product as 21×46 ?" One pupil said, "It's just like $2 \times 1 = 1 \times 2$." She then asked another pupil if you could use 4×3 to show that interchanging multiplier and multiplicand did not change the product.

The consideration of solution "b" led to the fact that you first multiplied by 3 and then by 7 because $3 \times 7 = 21$. The teacher stated that since this method of multiplying twice seemed like a good procedure, everyone should try it. For this trial, the following examples were written on the board:

8	26	51	37
<u>×6</u>	<u>×15</u>	<u>×36</u>	<u>×35</u>

Pupils were instructed to first find the product by the regular method and then to use "the multiplying twice" procedure. In the short discussion following the trial, the teacher asked, "What is especially good about this multiplying twice?" It was agreed that the good points were (1) you got away from 2-figure multipliers, and (2) you used other figures as multipliers.

Attention was next directed to solutions "c" and "d." Since these ways of using two or three numbers which equaled the multiplier also seemed good other solutions, all pupils were asked to use this check on the above examples.

SOCIAL STUDIES IN UNIVERSITY ELEMENTARY SCHOOL

On January 24 the class (6th grade) gave a final summary of their study of Canada by giving a summary report of what they had learned. At the close of the summary report class period the teacher said, "For the remainder of this year we are going to study our neighbors to the south. . . . Latin American was known, but no good answer as to why our southern neighbors were called Latin American was known. The teacher suggested that that "might be a good question to discuss with your parents tonight."

January 25. After listening to enthusiastic and accurate reports of why Latin America is so named, the teacher directed attention to the books on the social studies table. In each book was a marker on which was written one question. The questions were of this type: "Who were the Aztecs?" "What early explorers visited Latin America?" etc. The remainder of the period and part of the next day were spent by the pupils in finding the answers to the marked questions and in exploring the books. January 29 and parts of the 30th were given to reports of interesting things learned, and to further reading, some by the teacher to the group. A motion picture on "contrasts between our life and life in Latin America" was seen.

This general exploration of Latin American lands was terminated on February 1 and attention centered on Brazil. From the map some idea of size and the major topographic features were identified. Members of the class offered some information on life in the Brazilian

jungle lands. A motion picture provided some additional background information.

On February 4 the class period was given to the raising of questions to guide further study of Brazil. The setting for this question-raising lesson was provided through this statement by the teacher: "In our reading and discussion of the last few days we have learned a number of things about Latin America, especially Brazil. I am sure there are other important things to learn about Brazil and actually we may not know well some of the things we have reported. Today let's raise questions about Brazil which we can use in further study of that country."

The questions as given by class members were written on the board by the teacher. The pupil secretary of the class copied the questions. These were later copied on ditto master by the teacher and a copy for each pupil was made by the school secretary.

BRAZIL

An Outline of Study

- I. How has the history of Brazil affected the lives of the people?
 - A. Who were the early explorers? When and why did they come?
 - B. Who were the early settlers? Where did they settle? What was this land like when they first came?
 - C. How long did the Portuguese control this land? How did they rule it? How did the colonists get their freedom?
 - D. What kind of government was then set up?
 - E. What influences do we see of this early history there today?
- II. What are the people of Brazil like?
 - A. What is its population? How does it compare with that of the U.S.? What races and nationalities are represented? What part of the people belong to each race?
 - B. What types of work and handicraft are carried on in providing for food, clothes, and shelter?
 - C. What are the outstanding customs?
 1. In their home life?
 2. In religion?
 3. In entertainment?

- D. What are their schools like? How well educated are they? What are their problems in education?
- E. What is their form of government? What part do the people have in it? What are their problems in this way?
- III. How do the physical features affect the lives of the people?
 - A. How large are the land and the water area?
 - B. What are the outstanding land features?
 - C. What are the important water areas?
 - D. What is its precipitation and temperature in different areas at different seasons? Do they vary? Why?
 - E. In what parts do most of the people live? Why?
- IV. What are the natural resources? How are these being used in the industrial development of Brazil?
 - A. What are the leading minerals? Where are they found? How are they used?
 - B. What part of the land is forested? Where is the forested area? What kinds of trees are found? What are the leading forest products? How are they used?
 - C. What is the story of the development of the rubber industry? How does this industry rank today? Where are the rubber trees found? How is it collected? What is the process of refining it?
 - D. How well developed is farming in Brazil?
 - 1. Where is coffee grown? How is it grown and harvested? How does it rank as an agricultural product? How is it manufactured?
 - 2. Where is the sugar-cane area? Why is this area suitable? How is the cane grown and harvested? How is sugar made from it?
 - 3. Where is cotton raised? Why? How important is it agriculturally?
 - 4. In what areas are bananas found? Is this a wild or a cultivated crop? How old do trees have to be to bear? When do bananas get ripe?
 - 5. What are other crops of less importance? Where are jute and manioc found? How are they used?
 - E. How important is the livestock industry? Where are the important areas? Why are these suitable? What animals are raised?

- F. Where are the important fishing areas? What fish are caught? What uses are made of them? How does fishing rank among Brazil's other industries?
 - G. What are the possibilities for water power? Where are the important hydroelectric plants? What uses are made of this power?
 - H. Where are the important manufacturing cities? What advantages do these cities have that make them important for manufacturing? What are the leading products?
 - I. How does tourist trade rank as an industry? What areas attract visitors, and why?
- V. What are Brazil's trade relations with other countries of Latin America and with the rest of the world?
- A. What are Brazil's leading exports? What is the value of these exports, and where are they sent?
 - B. What are Brazil's leading imports, and from where do they come?
 - C. What are the important shipping ports? For what is each best known?
 - D. What are the main trade routes with the U. S. and the rest of the world?
 - E. How much and what kind of trade does Brazil carry on with other countries of Latin America?
 - F. Is Brazil's trade with other countries increasing or decreasing? Why?
- VI. How have Brazilians been brought closer together as a nation and with the rest of the world?
- A. What cities are located in the interior of Brazil? How are they important to the rest of Brazil?
 - B. How well developed is transportation in Brazil—roads, railroads, airways? What are the possibilities for greater development in transportation? How can such developments be used to improve Brazil as a nation?
 - C. What minerals might be put to greater use? How might this be done?
 - D. How well developed is this country agriculturally? What changes are needed?
 - E. What is needed if Brazil is to become a more important industrial nation?

F. What other improvements are needed if Brazil is to grow in power?

The social studies class periods on February 6 and 7 were spent in finding answers to the various questions. To facilitate the use of various references and other sources, it was suggested that any group of questions might be considered first. Most pupils took notes from sources to support the conclusions they had reached.

The class period on February 8 was given over to discussion. For each of the six major questions a generalization or summary statement was prepared.

Meaningfulness of Material

Meaning is in the individual, not in material. All we find in the world are constants and changes. Constants and uniform changes may become learned *signs*, in Tolman's language. When phenomena thus become signs—that is, take on meaning—they do not change. It is we who change.

A discussion of meaning could certainly take us far afield. Let us consider here no more than a hint at a behavioristic approach to meaning. In S-R psychology meaning is the response that is made or can be made, or an *anticipatory response* made, to phenomena. The essence of 'signness' is the response or anticipatory response. Perhaps all points of view allow that the response is the *test* or measure of meaning. The behavioristic view holds that the response *is* the meaning. The meaning of "cat" is a function of the responses that can be made about cat. "Cat-dog" is a meaningful pair of nouns because one as a stimulus tends to awaken the other as a response. There is the further fact that countless thousands of things, because of common experience, awaken the same responses in a given society. Because of this fact we may properly speak of material as being meaningful, or of instruction as being meaningful. What we are really saying at the practical level is that material has the power of awakening common responses in a large group of people, depending upon their several abilities and experiences. Since meaning is really in

persons, not in materials of instruction, it happens of course that the same item of instructional material may mean different things to different pupils.

That selections of material (of a constant number of elements) vary in difficulty is self-evident. Therefore, knowledge of the conditions in terms of which the difficulty of selections of constant length varies is of first-rate importance in any attempt to understand the processes of learning. Such conditions as previous learning, meaning, insight, and logical character of the material suggest themselves at once. In a very general sense, meaning and logical character of the material, and perhaps insight, reduce to past experience. Meaning, insight, and logical relations are psychological phenomena and have no existence *sui generis* in material of learning. Material is not inherently meaningful; it is endowed with meaning by a reacting individual, and experience, or previous reaction, is a necessary condition. Similarly, material is not logical apart from someone by whom it is apprehended as logical. To put the matter in another way, meaningful, insightful, and logical materials are partially learned already. *Transfer of training* is a necessary condition to an individual's having insight or perceiving material in a meaningful or logical way. In the case of logical material the data are incorporated into the framework of a previously acquired system. A list of 15 pairs of familiar words is easier to learn by far than a list of 15 pairs of nonsense syllables. Inasmuch as the familiar words are necessarily already known, it is easier to provide the requisite associative cues for their recall. Moreover, in learning a list of 15 familiar words, only 15 things require learning. The subject already knows how to spell them. In learning 15 3-letter nonsense syllables, 45 things must be learned. There is no special virtue in a word save that its spelling, sound, and meanings are known already. XOJ—KUC are no more difficult, meaningless, or illogical than CAT—DOG to the uninitiated.

In any event, meaningful material is partially learned material. Material is meaningful because past experience has made it so. There is nothing of great importance to systematic psychology in

the demonstration that one kind of material, meaningful, logical, related, or otherwise, is easier to learn or is better remembered than some other kind. When material is made meaningful or logical, it is brought within the operations of transfer of training.

"This sentence is much easier to remember than a series of nonsense syllables of the same length." It is so because the letters and syllables are grouped into words that are well known to the reader. Moreover, the order of the words conforms to well-established grammatical usage and, taken together, the words comprise what is known as a thought unit. The sentence just quoted is rendered as follows in another language: *Il est plus facile de se souvenir de cette phrase que d'une série de syllabes de non-sens de la même longueur.* Needless to say, if this language is unfamiliar, the sentence will be learned with some difficulty. Even so, it is not entirely strange; it is recognized as language, word units are perceived, the letters are known, and the words are pronounceable after a fashion—to such an extent does past experience transfer to this situation. How would a "dawn man" have fared in committing such a sentence to memory? How would he have reproduced it if somehow he could have gained, at a tremendous cost, a succession of appropriate visual images of it? The following sentence says approximately the same thing as the two preceding ones in still a different language:

這句話比一串二樣長的無意義音節容易記

This sentence in Chinese has very little meaning for most American readers; their previous learning has comparatively little pertinence to the situation; transfer is at a low point. Perhaps the greatest single difficulty met—and one which, by contrast with the reproduction of English words and sentences brings into sharp relief the value of transfer in learning and remembering—is the fact that the reader does not have any previously learned *names* for the characters, and does not already know how to make a graphic inscription of each such name.

Recently, Katona has published the results of some interesting research on materials that are capable of being learned only by

rote and other materials that can be learned by "apprehending a principle."²⁵ Attention is called also to an investigation by Guilford, on learning forms, and one by Barker in perceptual motor learning.²⁶ Wertheimer's book cited in Chapter X contains many interesting and practical examples.

The fact that logically organized material is learned more rapidly and retained more effectively than unorganized material is perhaps the best illustration of the efficacy of transfer. Logical systems are learned by the individual in the course of his personal history. *In making use of logical organization in learning and remembering a particular set of data a person utilizes previous experience*—a condition that fulfills the requirements of the definition of "transfer."

Motivation

Presumably the ultimate social utility of schooling rests lightly upon the young pupil. He is much more likely to be concerned about his present needs, such as growing up, gaining recognition, belonging to peer groups, response from and security in the esteem of his fellows, and feelings of self-worth. The pupil can be expected to take an interest in those activities which he has found do satisfy these needs. As he grows older he may become more conscious of his future citizenship needs for an education, but even here that which sustains his efforts to this end is the daily satisfaction he derives from working toward his ideal, stemming from and buttressed by all kinds of social pressures and sanctions. Thus what we have to work with is the immediate gratification of present needs.

Our one classic in this field is Dewey's book.²⁷ In this Dewey makes a distinction between immediate and mediate interest.

²⁵ G. Katona, *Organizing and Memorizing* (New York: Columbia University Press, 1940), Chap. II.

²⁶ J. P. Guilford, "The Role of Form in Learning," *Journal of Experimental Psychology*, 10 (1927), 415-23; R. G. Barker, "A Temporal Finger Maze," *American Journal of Psychology*, 43 (1931), 634-36.

²⁷ J. Dewey, *Interest and Effort in Education* (Boston: Houghton Mifflin Co., 1913).

Immediate interest, or as is sometimes said, intrinsic interest, is that which "puts itself forth with no thought of anything beyond." Mediate interest is interest in *means* to an end. It must be admitted that in most instances we are unable to differentiate one from the other. This may be simple enough in the case of primary motives. But what about interest in activities that afford social recognition, a sense of security, and ego gratification? It is always a question as to the extent to which the latter are implicated in interests that are ostensibly immediate, such as play activities, hobbies, or literary appreciation. Fortunately, the distinction is not important at the practical level. The propulsive and affective aspects of mediate interest are probably as great as those of immediate interest. The recognition of this fact is Dewey's most distinctive contribution to the subject.

A pupil may have no immediate interest in an activity at the outset, but may prosecute it as a means of satisfying another interest. But if the end activity satisfies a genuine interest, if it meets a felt need, the mediating activity may in turn become an object of interest. That is, as Dewey suggests, the pupil may, if he comes to see the act, thing, or fact "not by itself, but as a part of a larger whole," acquire an interest in the things that are included in the whole. "Here, and here only, have we the reality of the idea of 'making things interesting.'" The assertion that after subject matter has been selected the teacher should make it interesting

... combines in itself two thoroughgoing errors. On one side, it makes the selection of subject matter quite independent of the question of interest... and further, it reduces method in instruction to more or less external and artificial devices for dressing up the unrelated materials, so that they will get some hold upon attention. In reality, the principle of "making things interesting" means that subjects be selected in relation to the child's present experience, powers, and needs; and that... the new material be presented in such a way as to enable the child to appreciate its bearings, its relationships, its value in connection with what already has significance for him."²⁸

²⁸ *Ibid.*, pp. 23-24.

Every normal person has an intrinsic interest in a feeling of adequacy and personal competence and a sense of security in the esteem of others. Success in school, bearing as it does the stamp of social approval, is a means of securing the realization of this interest. It is inevitable that this mediate interest, as it is perceived as a means to an end, shall become an object of interest in itself. Good marks, and attendant approval upon the part of those whose opinions signify much, are rewards at the outset. But motives are strong, persistent forms of stimulation. In other words, an incentive that originally was a means of eliciting motivated behavior may, if the rewards are sufficiently strong, become itself a motive.²⁹ This concept has already been developed in Chapter X.

An interest an older student may have is that of getting an education. The desire to be a well-informed and cultured individual, or to be successful vocationally, may be quite strong, and happily, it is one capable of cultivation. Those activities which are perceived as means of furthering this interest may, if the interest is strong, themselves become objects of interest. The student does not ponder the question of whether the labors to which he addresses himself are intrinsically interesting. He probably recognizes that they are in and of themselves less attractive than others he could engage in. Rather he asks himself whether or not they further his purpose of getting an education; and if an affirmative answer is arrived at, he applies himself to the task the interest of which derives from the larger interest. The activity or the content itself need not possess such a degree of interest that the student would be drawn to it without the selective factor provided by the larger interest or purpose. Indeed, a program of education committed to making tasks interesting in and of themselves is likely to lack direction and unity of purpose.

All these considerations lead to the conclusion that interest does not merely lead to mental development, but is itself a condi-

²⁹ Cf. N. E. Miller and J. Dollard, *Social Learning and Imitation* (New Haven: Yale University Press, 1941), Chap. IV.

tion of mental development. As James said, "Only what we partly know already inspires us with a desire to know more."³⁰

Children have a natural proclivity toward activity. In the place of reflection and contemplation, we find activity. Activities or occupations should be made the articulating centers of the school, says Dewey—occupations that are engaged in as social activity. When the social spirit is present, mutual assistance becomes a virtue. "Helping others, instead of being a form of charity which impoverishes the recipient, is simply an aid in setting free the powers and furthering the impulses of the one helped."³¹ The great majority of children of school age like to work and play together. Those who do not like to can ordinarily be brought to this attitude rather easily. Children like to communicate with each other and interchange ideas and observations. They like to make things and do things individually and in groups.

Let us give point to this by seeing how the principles work themselves out in a series of projects in connection with Indian life, an area of concentration that has proved to be very popular in the primary grades. In some schools this area has been made the articulating core of an entire year's work. The pupils engage in a number of projects centering about the major problems of Indian life, such as food, clothing, shelter, art, religion, language, and sports. To prepare food as the Indians in various localities prepared it; to preserve it as they preserved it; to make an article of clothing as they made it; to fabricate and use tools, to tan hides, to make a tepee, as they did—all this requires the acquisition of a great deal of knowledge. There is, however, an important feature in connection with the acquisition of such knowledge: the pupils are learning, ostensibly, not for the sake of preparing an assigned lesson, but for the sake of carrying out an interesting project.

This interesting and romantic subject, buttressed by the stimu-

³⁰ W. James, *Psychology* (New York: Henry Holt and Co., 2 vols., 1890), Vol. 2, p. 111.

³¹ J. Dewey, *The School and Society* (Chicago: University of Chicago Press, 1900), p. 29.

lus of a social atmosphere, is to the young learner an end that justifies the means. It is fun. The activities have meaning and purpose. The teacher, of course, has an additional purpose. It becomes a means of teaching pupils to read, to express themselves, and to work and live together. They read not merely to do reading, but to find out. This situation affords a natural medium for the teaching of language and art. The pupils have something to express and enjoy expressing it. What a difference, says Dewey, between having something to say and having to say something! For children, says he, language is primarily a social thing. It should be cultivated in a social situation.

One can hardly imagine a more natural or engaging way of teaching the basic lessons in geography than by studying the mode of life of widely dispersed tribes as it is dictated by the varying geographical conditions of a vast continent. Pupils learn about climate, wild life, grasses, trees, rivers, plains, and so on, as they are interdependent upon each other and as they affect the life of man. By contrasting the Indian's mode of life with that of our own, the door is opened for the teaching of important lessons about the effect of the impact of culture on the life of man.

Human Relations in the Classroom

This topic is in some respects a logical extension of the previous one—motivation. Perhaps we could not readily picture a better psychological atmosphere in the school than one in which the general morale is good, one in which motivation stems in large part from positive identification (see Chapters II and XV) with the teacher and the school regime, and one in which wholesome friendships and peer relations prevail. We are not only interested in the amount or intensity of motivation, but also in kind or quality.

Some of the investigations on overachievement and underachievement bear upon this problem. Overachievers are pupils whose academic achievement exceeds predictions made upon the basis of intelligence scores. Underachievers are those whose aca-

demic achievement falls below the predicted level. Among over-achievers we find a disproportionate number of pupils who appear to be overly anxious and unhappy. It is as if they were over-compensating. They tend to be conformers. Underachievers tend to display negative attitudes toward authority. They seem to have less interest in school and are less well-behaved than over-achievers.

From the foregoing we may infer that too much motivation, at least too much of the wrong kind, may be undesirable. If the pupil is happily adjusted, gives evidence of feeling secure in his relations with his peers and with the adults who figure prominently in his life and otherwise seems self-assured, and excels in school simply as an expression of the joy of participation, we would think this ideal. But if his excellence reflects overcompensation, overanxiousness, and an intensity that may suggest feelings of inadequacy and insecurity, we can conclude that the pupil is as much in need of attention as one who is achieving at a level much below his capacity.

The importance of the teacher, if we really fully understand it, might be almost disquieting. To begin with, it might be well to bear in mind that the teacher is quite a different person, quite a different symbol, from pupils. In our desire to get along with our pupils and to understand them some of us may think the thing to do is be one of them. This is not the case. Slavson's exposition of the role of the therapist in group therapy work (Chapter XV) may be of some help to us in defining the role of the teacher. The role of the teacher is also discussed in the concluding chapter of this book. Perhaps it will suffice for the present to point out, by way of paraphrasing Slavson, that the teacher's most distinctive and significant role, insofar as human relations are concerned, is that of a positive, accepting adult. This means that all pupils, none more than others, are unconditionally accepted by the teacher. As Slavson says, every child needs the security of unconditional love and acceptance.³²

³² S. R. Slavson, *Introduction to Group Therapy* (New York: The Commonwealth Fund, 1943).

How are we to convince the pupils of the reality of our unconditional love and acceptance? We can answer this question negatively by saying "not by showering them with love and affection." Ideally, the teacher should be a strong, accepting, professionally competent person, a person who knows how to help pupils as required, who knows when to offer commendation and when to withhold it. In some cases the way the teacher makes the pupil feel about himself may be as important as the help given with his lessons. There are pupils from minority racial and national groups, pupils from underprivileged family backgrounds, as well as pupils from every social stratum, who feel neglected or even rejected. These pupils should feel that they belong and are fully accepted.

It may be that it is fortunate in a way that we do not always know what the pupils need from the teacher. Lest we show behavior to some that others may interpret as favoritism we cannot bestow too much personal attention. The aim should be to help all, to accept all, to deal with all wisely and objectively, as the physician does with his patient, to the end that each pupil may draw from his teacher such emotional strength as he needs. As a kind of rule of thumb it may be suggested that we *accept* a great deal, *approve* with discrimination, and *reject* sparingly indeed.

From the Honored Past

Herbart. Beginning the productive period of his life a little over a hundred years after the publication of Locke's classical *Essay Concerning Human Understanding*, Herbart (1776-1841) made a forceful educational interpretation of Locke's philosophical teaching. He is best known to students of education for his applications to mental development of the concept of *apperception* and for his *formal steps* of teaching.³³ In the field of educational psychology Herbart is rivaled only by Dewey and Thorndike.

The formal steps of teaching, which went out of style in

³³ Sir John Adams, *The Herbartian Psychology Applied to Education* (Boston: D. C. Heath and Co., 1897), p. 1.

America toward the close of the last century, had dominated teaching through several generations of students. They are still our best conceptualization of how the pupil learns, and together with the underlying principle of apperception, our best account of how the human mind develops in the results of education. It is for this reason that a brief account of Herbart's teaching is attempted here. No one today would, of course, accept the five formal steps as a teaching model. Perhaps it was the *formal* adherence to these steps that finally brought them into disfavor. But Herbart's conception of the processes by which a pupil arrives at a useful understanding of anything is as vital today as ever it was.

(1) *Preparation*. By preparation Herbart meant the preparation of the child to perceive; the giving to the mind the desired set; the arousal of interest and expectation. Moreover, if the pupil's background of experience is inadequate for a particular instructional purpose, it should be made adequate before presentation of the new material begins.

(2) *Presentation*. The guiding principle in presentation is clear from the general meaning of "apperception": instruction is predicated upon the available fund of previous experience; presentation of the new in terms of the old, the unfamiliar in terms of the familiar. Herbart and his followers committed themselves to a program of ascertaining what the child's existing store of knowledge was and of adapting instruction to it. As an example of a representative attempt at a statistical treatment of the "content of the child's mind," the following investigation reported by Lange in 1878 is cited: Of 500 city children, in 33 people's schools, 82 per cent had no idea of a sunrise; 37 per cent had never seen a grainfield, 49 per cent, a pond, 82 per cent, an oak, 29 per cent, a riverbank; 52 per cent had never been on a mountain, 50 per cent had never been in a village.³⁴ These surveys

³⁴ K. Lange, *Apperception: A Monograph on Psychology and Pedagogy*, 160-61 (translated by members of the Herbart Club) (Boston: D. C. Heath and Co., 1896), pp. 160-61.

were forerunners of those made in America by G. Stanley Hall in which his "questionnaire" figured so prominently.

For the early Herbartians a cardinal point, but not a necessary one, in the method of presentation, and perhaps the weakest point in their whole armor, was their adherence to the "culture epochs" theory of education—an educational adaptation of the doctrine of recapitulation.³⁵ This unnecessary and indefensible doctrine also helped to discredit the Herbartian movement. It assumed that the anatomical traits of a particular member of a species appear in embryonic development in the exact order of their phylogenetic development—that the ontogeny repeats the phylogeny. Similarly, the proponents maintained that instinctive, emotional, and other mental traits of the individual child recapitulate his phylogenetic history. In the course of his development, each child, and each animal, presents, according to this doctrine, a sort of abbreviated history of his race. Educators became interested in the order of emergence of these mental traits. The instructional materials for any given stage in a child's development were to be drawn from the appropriate corresponding stage in racial development. Moreover, each stage, no matter how destructive or uncivilized, was to be respected; the stage of barbarism, it was argued, should occasion no particular alarm; it would not persist, but would disappear when it had served its purpose in the life of the child. Appropriate is Hall's classical remark: "Permit the frog to be a tadpole before becoming a frog. . . . To endeavor to hurry up the process by cutting off the tadpole's tail results in spoiling both the tadpole and the frog."³⁶

The mental development of the child corresponds in general to the chief phases in the development of his people or of mankind. The mind-development of the child therefore cannot be better furthered than when he receives his mental nourishment from the general development of culture as it is laid down in

³⁵ Cf. F. E. Bolton, *Principles of Education* (New York: Charles Scribner's Sons, 1910), Chap. VI.

³⁶ Quoted from J. M. Fletcher, *Psychology in Education* (New York: Doubleday, Doran and Co., 1934), p. 16.

literature and history. Every pupil should accordingly pass successively through each of the chief epochs of the general mental development of mankind suitable to his stage of advancement.³⁷

(3) *Association*. What new understandings the pupil may gain depend upon the assimilation of the new percept and the existing and available store of ideas, as has already been noted. But from the standpoint of method this step had a deeper significance and purpose. It was preliminary to abstraction. By carefully guiding the pupil, by leading him to make certain associations between the new and the old, he may arrive at *general knowledge*. This step does not seem so formal, nor indeed so sterile, when it is realized that it was used by many of the later proponents at least as a period of further study and thought. It was not something that happened after learning, but was a part of it. The second step, presentation, has actually come to mean preliminary presentation and as such is in part a form of preparation.

Herbart did not teach that mental development takes place merely by adding the new to the old, as by a process of agglutination, although he or his followers frequently spoke as if this is what was meant. To avoid this connotation, later writers substituted the term "assimilation." The new both colors and is colored by the old. The mind tends to be logical; it will not accept incompatible ideas as if they were joined together only by association. Mental development is a process of assimilation and synthesis. What a person knows about feudal life in the Middle Ages, for example, represents organized knowledge acquired from different sources and at different times in his life.

(4) *System*. The fourth step, system, is a logical extension of the third. The new material of instruction is classified—a process said to be the final step in arriving at general, as opposed to particular, knowledge. Classification involves:

(1) the separation of the notional from the concrete; (2) the formulation of the statement of the notional in language; (3) the placing of

³⁷ T. Ziller, quoted in Lange, *op. cit.*, pp. 110-11.

the concept thus attained in its proper place in already formed series of concepts . . . (4) the repetition and securing of the concept.³⁸

(5) *Application*. The applications of learning were not left to chance in the Herbartian system. Provision was made for *formal* application in each lesson unit. This step may be accepted as a cardinal principle of teaching if the word "formal" be omitted. Indeed, application is little short of a password in the teaching of science and the social studies in high school today.

Implicit in Herbart's teaching is the thought that the reception any new idea gets is influenced by the fund of existing ideas of the individual to whom it is presented. A person's reaction to a new situation depends, in part, upon his previous reactions to other similar situations. Words, perfectly familiar words, do not mean the same thing to the mature teacher and the immature pupil. Moreover, the difficulty is not resolved when objects and things are substituted for words. The pupil does not see the same thing in an object that the teacher sees. One of the great functions of education is the furnishing of an adequate background with which to apprehend and interpret the facts of the world as they are presented to the senses. "The best-educated human being is he who has the biggest and best-arranged apperceptive masses dealing with the life he is likely to lead."³⁹

The question of efficiency. The focus of educational psychology has undergone some pronounced changes within the last twenty-five or thirty years. One of the most important of these has been a general shift away from emphasis upon efficiency. One of the three volumes of Thorndike's classical work on education published in 1914 was devoted to "Work and Fatigue." Thus during this period of our history educational psychologists were vitally interested in factors affecting efficiency of performance—work phenomena and fatigue. Likewise, a great deal of attention was focused upon efficiency in learning. Much solid and valuable information came out of the laboratories of this period. Some of

³⁸ Herbart, quoted in B. Mulliner, *The Application of Psychology to the Science of Education* (New York: Charles Scribner's Sons, 1898), p. cxi.

³⁹ Adams, *The Herbartian Psychology*, p. 75.

the experimental results will be briefly summarized here. This will be done with a minimum of documentation. References are readily available in the older textbooks in educational psychology.

(1) *Work-curve phenomena*. A work curve differs from a learning curve in the sense that it begins where the latter leaves off. That is, we begin to study work and fatigue phenomena when the subjects show no further improvement from practice. The following characteristics of work curves have been recognized for many years: *initial spurt*, *end spurt*, *fluctuation*, *warm-up*, and *general decrement*. Work on a well-practiced task usually begins at an initial high level, which lasts but for a few seconds. This is followed by a temporary drop. If the time intervals are not quite short, the initial-spurt phenomenon may be covered up by the phenomenon of warm-up, a kind of general adaptation to the task resulting in a general increase in output, which may last several minutes. Even in the performance of a well-practiced task subjects show rather wide fluctuations in performance during the course of a single practice session. The end spurt refers to an increase in output that tends to occur near the end of longer work periods, when the subject is aware that the end is near. On shorter tasks this may not occur. Rather there may be a general rise in performance throughout the practice period—again if the subject is aware of the length of the practice period. This fact also tells us that the general decrement does not occur on the shorter tasks. Decrement is, however, a general feature of long, continuous practice. It is true, of course, that persons *can* work at tasks requiring no great outlay of physical effort for many consecutive hours without an appreciable loss in output, if they are sufficiently motivated. In such cases work becomes increasingly less satisfying. Under ordinary circumstances the subject is likely to reduce his rate of performance and thus maintain the *curve of satisfyingness* at a somewhat even level.

(2) *Mental fatigue*. The foregoing suggests the topic of mental fatigue. This phenomenon, as the term is construed, refers to a particular kind of fatigue, not merely to the fatigue resulting from mental work. Incidentally, there is no satisfactory definition of

"mental work." About the best we can do is think of it as work involving a high verbal component. Mental fatigue can arise from any kind of work. A person

... would seem likely to discontinue or decrease mental work because continuing it annoys him rather than because some inner fund of impulsion, which might be likened to physical potential energy, was running low. Work without rest ... becomes less satisfying (1) by losing zest of novelty, (2) by producing ennui, a certain intellectual nausea, sensory pains and even headache, and (3) imposing certain deprivations—for instance from physical exercise, social intercourse, or loss of sleep.⁴⁰

To the same purpose Dodge writes:

Within physiological limits, all fatigue decrement in the results of work is relative to the intensity of the stimulus. In any complex of competing tendencies the relatively greater fatigue of one tendency will tend to eliminate it from competition in favor of the less fatigued tendencies. ... Relative fatigue ... is not exhaustion, but prevents it.⁴¹

Thus mental fatigue, or, in Dodge's language, relative fatigue, is viewed as a protective device, admitting that in the humdrum of civilized living many of us seem overprotected.

(3) *Loss of sleep.* This topic is really continuous with the last one. At best loss of sleep, within practical limits, is no more than a rationalization for postponing work, or for having done poorly on an examination. This, of course, refers to work efficiency, not general health. Investigators have shown repeatedly that subjects in the laboratory can perform fully as well on mental tasks after forty-eight hours or more without sleep as when they have enjoyed normal sleep, and can continue to do so for hours. Under such conditions, however, work becomes much more disagreeable.

(4) *Atmospheric conditions.* Poor ventilation has two important effects from a psychological standpoint—reduction in output

⁴⁰ E. L. Thorndike, *Educational Psychology* (2 vols., New York: Teachers College, Columbia University, 1914), Vol. 3, p. 122.

⁴¹ R. Dodge, "The Laws of Relative Fatigue," *Psychological Review*, 24 (1917), 89-113.

and increased discomfort for the worker. Alleviation except by chance depends upon a knowledge of the causes of the symptoms. There appears to be a fairly general popular belief that the effects are owing to the depletion of oxygen and the excessive accumulation of carbon dioxide. This is not true. The atmosphere contains about 21 per cent oxygen, under standard conditions, and about .03 per cent carbon dioxide. The oxygen content of a poorly ventilated schoolroom or factory at the end of a work day is still about 19 per cent. By the use of an oxygen chamber in which the oxygen content can be systematically varied, it has been found that no marked effects upon efficiency of work are evidenced until the reduction approximates 50 per cent of the normal. In a poorly ventilated workroom the carbon-dioxide content increases by the end of the day from about .03 to about .3 per cent.⁴² This figure must be increased to about 2.4 per cent to produce any very noticeable effect.

Further evidence that the effects of poor ventilation are not due to the chemical content of the air was brought forward in 1923 by the New York State Ventilation Commission. The investigators, Thorndike, McCall, and others, so contrived breathing tubes that the workers in a factory could breathe fresh outside air. This expediency did not lessen the symptoms. On the other hand, the symptoms did not appear when the men, working under ideal atmospheric conditions, were required, by means of breathing tubes, to breathe the stale air from the "sweatshop."

From the standpoint of efficiency the problem is essentially one of keeping the body at a suitable temperature. This cannot be controlled adequately by the simple expediency of keeping the room or the factory at a specified temperature. Relative humidity and the circulation of air are attendant variables. When relative humidity is excessively high or when the atmosphere is stagnant, the liberation of heat incident to work and the normal functioning of the body is interfered with, owing to the film of moisture that envelops the body.

⁴² J. P. Lawson, "The Effects of Deprivation of Oxygen upon Mental Processes," *British Journal of Psychology*, 13 (1923), 417-34.

(5) *Diurnal variations.* Perhaps most teachers have wondered if their pupils work more efficiently at some periods during the day than at others. It seems that they do, though the particular periods of which this is true may be a bit surprising. For a great variety of mental tasks efficiency, without the exception of a single task, has been found to increase throughout the forenoon, the 11 to 12 hour being the best. The 1 to 2 hour resembled the first hour in the morning. Again the 2 to 3 hour is better than the 1 to 2 hour. These are average results. There may be individual differences that show departure from the general trend.

(6) *Rest periods.* In industrial work short, frequent rest periods have been found to increase daily output. Men do more work, at least where circumstances are such as to permit this, when allowed a 3-minute rest period every 15 minutes, for example, than they do when working continuously for the same over-all length of time. This kind of thing has not been worked out for school situations. The issue may not actually be too important, because of the frequent change of activity during the day. A change in activity is known to have some of the advantages of a rest period.

Efficiency in learning. Within the last two or three decades attention in school has focused upon the total development of the pupil—his general adjustment to school life, his felt needs, and the like. *Efficiency* in learning such subjects as addition and subtraction facts, handwriting, and spelling, and in memorization, does not command the interest it did, say thirty years ago. The older literature of educational psychology contains a great deal of established information on this general subject. Perhaps much of it was always of less interest to teachers than to psychologists. This work has been of considerable interest to psychologists who are primarily concerned with the question of how the mind operates. There is also a suspicion that students may like a good deal of direction and are quite interested in learning to do things efficiently.

Here will be given the briefest kind of account of some of the more important problems, and as in the case of the discussion of

work and fatigue, there will be little documentation. Again, the older textbooks in educational and general psychology are rich in references. Generally, reports of experimental investigations of most of these topics have ceased to appear in journals carrying material on educational psychology. As a matter of fact, it would be quite instructive to the serious student of educational psychology to go back and read some of the original research papers on these subjects. For the most part, the problems readily lent themselves to experimental investigation. Article for article, they compare quite favorably with our best efforts today.

(1) *Amount of material.* The fact that the difficulty of learning a list of materials increases as its length increases is a psychological fact of considerable interest. This does not mean simply that the time required to commit to memory a list of 24 stanzas of poetry, for example, is twice as great as that required to commit 12 stanzas. If both required the same number of trials, the time would double, because it would take twice as long to read a list of 24 stanzas as it would one of 12. What is meant is the fact that more trials and more time per stanza are required as the length increases. For example, Lyon obtained an average of 11 trials and 1.92 minutes per stanza for a list of 12 stanzas. For a list of 25 stanzas his means were 20 trials and 2.32 minutes per stanza. These facts argue that learning is a dynamic process, that there is some kind of interaction of part upon part which increases as the length increases. In contrast, on a sensitive photographic plate we do not have to increase the number of exposures as the number of objects or the amount of detail in the field increases.

(2) *Length of practice period.* This problem has some of the same elements as the question of rest periods just discussed. Since frequent rest periods are beneficial, we may infer that short practice periods are more efficacious than long ones. Such is the case. N. L. Perkins found that one reading per day of a list of paired nonsense syllables was nearly twice as effective as two readings per sitting, and three times as effective as four readings

per sitting. Uniformly experimental results have favored shorter practice periods.

(3) *Length of interval between practices.* There are two variables in distributed practice: length of the practice session and length of interval between practice sessions. Of the two the former is much more important. It should be noted, however, that in most of the experimental work relatively long intervals of 12 to 24 hours are the shortest that have been used. These are compared with longer ones of from 2 to 5 days.

(4) *Rate of item presentation.* Later, distributed practice has come to mean another thing—rate of item presentation or exposure time, as in the typical memory-drum experiment.⁴³ Varying degrees of distribution are secured by varying the exposure time per item. In one condition, for example, nonsense syllables may be presented at the rate of one every 2 seconds; in another, every 4 seconds; and in another, every 6 seconds, and so on. This form of distribution gives results similar to those obtained by the traditional forms.

(5) *Distribution of practice in school.* The optimal length of class periods cannot be determined upon the basis of research on distributed practice. There seems to be a demand in education for increasing the length of the class period. This has come about as a result of a change in the use made of the period—a change from a recitation to a work period, a point made earlier in connection with the co-operative assignment. The tendency now is to devote considerable time to the formulation of the project to be worked on within a period. Time is required to get the work under way, and considerably more time to make the necessary investigations. It is alleged that short class periods tend to encourage teacher-dominated assignments and the learning of “pat answers.”

There is, however, considerable learning of discrete materials

⁴³ C. I. Hovland, “Experimental Studies in Rate-learning Theory. III: Distribution of Practice with Varying Speeds of Syllable Presentation,” *Journal of Experimental Psychology*, 23 (1938), 172-90.

in school—spelling, handwriting, typing and shorthand, for example—in which it is quite feasible to use short practice periods. In the elementary school one is likely to find that the type of activity is changed rather frequently within a class period.

The one clear inference that has been drawn all along from the facts of distributed practice has been the injunction against both procrastination and cramming in the preparation of lessons.

(6) *Recall as a method of learning.* Gates's investigation on recall as a factor in memorization, published in 1917, has found its way into most of the textbooks in educational psychology since that day. His subjects, elementary-school pupils, practiced under five conditions, differing in the percentage of the total learning time devoted to reading. The percentages varied from 100 to 20. In the former, all the practice time was devoted to reading and rereading the lists. In the latter, 20 per cent of the time was spent in reading alone, the remaining 80 per cent, in recall, attempted recall, and self-prompting. During the portion of the practice period in which recall was a condition the pupils were instructed to recite as much as possible and to glance quickly at the copy when in need of prompting.

Of Gates's five conditions, those allowing the greatest proportion of recall and prompting were the most productive. The differences were large. There has been a good deal of research of this kind. Most of it has been concerned with memorization. There would seem to be little doubt that some of the time a student spends in reading his lessons could be spent profitably in recall, thought, and self-prompting. Participation in the recitation should accomplish some of the same purposes.

ADDITIONAL REFERENCES

- Berdie, R. F., ed., *Roles and Relationships in Counseling*, Minnesota Studies in Student Personnel Work, No. 3 (Minneapolis: University of Minnesota Press, 1953)
- Bernard, H. W., *Psychology of Learning and Teaching* (New York: McGraw-Hill Book Co., 1954)

- Bretsch, H. S., "Social Skills and Activities of Socially Accepted and Unaccepted Adolescents," *Journal of Educational Psychology*, 43 (1952), 449-58
- Cook, L. A. and E., *Intergroup Education* (New York: McGraw-Hill Book Co., 1954)
- Greene, H. A., Jorgensen, A. N., and Gerberich, J. R., *Measurement and Evaluation in the Secondary School* (New York: Longmans, Green and Co., 1954)
- Guetzkow, H., Kelly, E. L., and McKeachie, W. J., "An Experimental Comparison of Recitation, Discussion, and Tutorial Methods in College Teaching," *Journal of Educational Psychology*, 45 (1954), 193-207
- Hilliard, F., *Improving Social Learnings in the Elementary School* (New York: Bureau of Publications, Teachers College, Columbia University, 1954)
- Leichty, V. E., "What Makes a Test Item Bad?" *Journal of Educational Research*, 48 (1954), 115-21
- Little, T. C., and Ashmore, H. L., "An Experiment in Group Living," *Journal of Educational Research*, 45 (1951), 233-36
- Macomber, F. G., *Principles of Teaching in the Elementary School* (New York: American Book Company, 1954)
- "Mathematical Teaching Aids," *Chicago Schools Journal*, Vol. 35, Nos. 3-6, *Supplement*, Nov. 1953-Feb. 1954. Compiled by Joseph J. Urbancek
- Meenes, M., *Studying and Learning* (Garden City: Doubleday, 1954)
- Mensh, I. N., and Mason, E. P., "Relationship of School Atmosphere to Reactions in Frustrating Situations," *Journal of Educational Research*, 45 (1951), 275-86
- Michael, W. B., Herrold, E. E., and Cryan, E. W., "Survey of Student-Teacher Relationships," *Journal of Educational Research*, 44 (1951), 657-73
- Mursell, J. L., *Successful Teaching: Its Psychological Principles* (New York: McGraw-Hill Book Co., 1954)
- Perkins, Jr., H. V., "The Effects of Climate and Curriculum on Group Learning," *Journal of Educational Research*, 44 (1950), 269-86
- Simpson, R. H., *Improving Teaching-Learning Processes* (New York: Longmans, Green and Co., 1953)
- Sparks, J. N., "Teachers' Attitudes toward the Behavior Problems of Children," *Journal of Educational Psychology*, 43 (1952), 284-91

- Torgerson, T. L., and Adams, G. S., *Measurement and Evaluation for the Elementary-School Teacher* (New York: Dryden Press, 1954)
- Trow, W. C., *The Learning Process* (Washington, D. C.: Department of Classroom Teachers, American Educational Research Association, National Education Association, 1954)
- U. S. Office of Naval Research, *Differential Characteristics of the More Effective and Less Effective Teachers* (Washington, D. C.: Government Printing Office, 1953)
- "Vitalizing Student Activities in the Secondary School." *Bulletin of the National Association of Secondary School Principals*, Bulletin 36 (1952), 290
- Wispe, L. G., "Evaluating Section Teaching Methods in the Introductory Course," *Journal of Educational Research*, 45 (1951), 161-86
- Wright, H. F., *et al.*, "Toward a Psychological Ecology of the Classroom," *Journal of Educational Research*, 45 (1951), 187-200
- Wrightstone, J. W., "Measuring the Social Climate of a Classroom," *Journal of Educational Research*, 44 (1951), 341-51

MEMORY

IF THE VALUE OF EDUCATION were determined by the amount of learned material that can be recalled at a later time in life, we should have to conclude that nature had neglected to provide any good way of our making use of our marvelous capacities for learning.

It is indeed true by some criteria of memory that we forget most of what we learn. If those of us who are only a few years away from high school were to undertake to set down the things we learned in that period of study, they would not add up to a very impressive sum. The writer once had some pretension of being a Latin scholar. Today it is doubtful if he could read a single line from any of the standard works without the aid of a dictionary. By one usage it could be said that he has forgotten most of his Latin. But suppose that he, or another person in a similar position, could within a year or so relearn what required eight years to learn in the first place, or learn another foreign language more readily for having previously studied Latin: would we say all has been forgotten? Certainly we could say that many of the *effects* have not been lost.

Evidently then, we may mean several different things by retention and forgetting. We say we remember a verse if we can recite it, a historical fact if we can describe it, a scientific principle if we can apply it in thinking, or an acquaintance if we can call his name or recognize his face. There is also the fact that the learn-

ing of A makes possible the learning of B, or even the asking of questions beyond A which would not have been possible without A. These different usages are all quite legitimate. Perhaps the only caution required is that we do not make predictions about one usage from facts we know about another usage.

In the laboratory and in school we use a variety of measures of retention and forgetting. The most common of these are recall, recognition, relearning, and transfer of training effects, and the objective test.]The last may involve some mixture of all the others. In general, the amount of retention and forgetting evidenced varies with the criterion measures employed.

The Temporal Rate of Forgetting

Of the many results of Ebbinghaus' classical experiments in memory, the most celebrated is his curve of retention.¹ The data

TABLE XXVI
TEMPORAL RATE OF FORGETTING

<i>Interval</i>	<i>No. Tests</i>	<i>Per Cent Retained</i>
19 min.	12	58.2
63 min.	16	44.2
8 hrs., 45 min.	12	35.8
1 day	26	33.7
2 days	26	27.8
6 days	26	25.4
31 days	45	21.1

on which this curve is based are given in Table XXVI; the curve itself, with Luh's curve superimposed, is reproduced in Figure 12.²

Most investigators have found higher retention than did Eb-

¹ H. Ebbinghaus, *Memory*, trans. by H. A. Ruger and C. E. Bussenius (New York: Teachers College, Columbia University, 1913), pp. 68-75. (First published in German in 1885.)

² C. W. Luh, "The Conditions of Retention," *Psychological Monographs*, 31 (1922), Whole No. 142.

binghaus. This in itself is a matter of no particular psychological importance. Ebbinghaus' comparatively low retention scores may have been the result of individual idiosyncrasies (he was his own and only subject) or to other factors peculiar to his investigation. He learned several lists, one after another, at a single sitting and

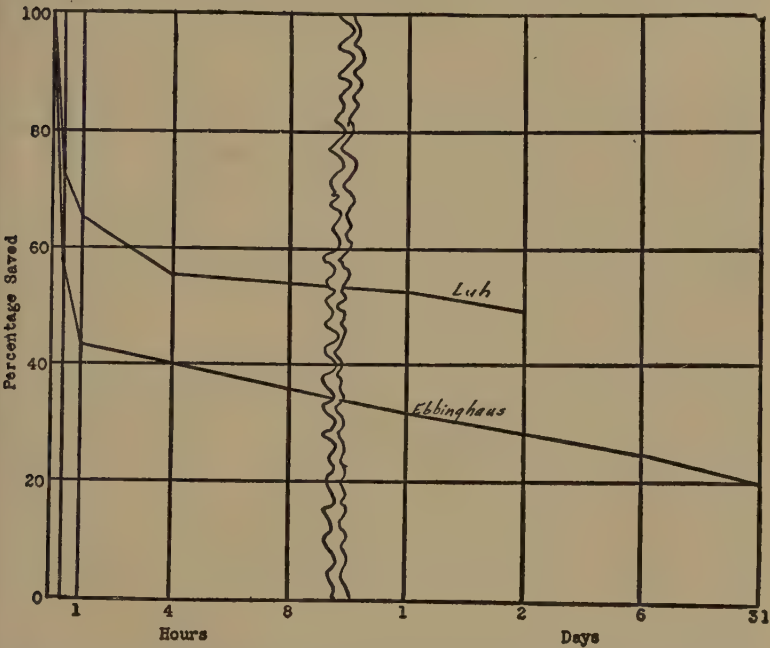


Fig. 12. The Ebbinghaus curve of forgetting. (Luh's data are shown in the upper line.)

continued to learn other lists during the various time intervals over which retention was being tested. In terms of data presented later these are the conditions that would yield the greatest amount of forgetting.

Let us now inquire as to the meaning and the generality of the Ebbinghaus curve. Let it be said at once that the curve does

not mean that 66.3 per cent of what one learns is forgotten within 24 hours. This does happen to be the figure obtained by Ebbinghaus; but it should be emphasized that 66.3 is the percentage forgotten by Ebbinghaus himself of the material used by him (nonsense syllables), learned to his criterion (two errorless repetitions) under the conditions of his experiment, and as measured by a particular method (relearning). It is known that the amount of forgetting per constant unit of time is highly variable, depending especially on the following conditions: the peculiarities of the subject, the nature of the material, the degree of learning, the method of learning, the activities of the subject between learning and the making of the retention test, and the nature of the test made; that is, the method of measurement used. In the light of these facts it is obvious that no general statement can be made about the *amount* of learned material that will be retained, apart from these variable conditions.

On the whole, an individual does forget the greater part of what he learns. It does not follow, however, that he forgets within one day the greater part of what he learns, nor does the significance of the Ebbinghaus curve lie in showing how much of anything a subject forgets.

The importance of Ebbinghaus' discovery lies in his demonstration that the initial rate of forgetting is more rapid than the rate at the later stages, that the subject forgets more during the first fourth or tenth of an interval of no practice than during any successive fourth or tenth, and that the rate decreases during successively equal intervals. These features of the curve are much more general than has usually been claimed. It would be surprising if there were no exceptions; but it appears that many of the alleged exceptions are artificial rather than real. One difficulty comes from a tendency to confuse the issue between the *amount* forgotten and the *form* of curve.

Retention of Academic Learning

A wholly satisfactory answer to the question of retention of academic learning is not at present available, nor are we able to say with certainty how much this matters. A man of forty or fifty can recall comparatively little of what he learned in high school or college. Realization of this state of affairs has led some to doubt the wisdom of their having gone to college or high school. The fallibility of this position, if assumed generally, is too obvious to require comment. A more important test of the value of what is learned in school is how much it transfers to life situations, how much it becomes the basis for the acquisition of other knowledge, how much it is utilized as a basis of a lifetime of growth and professional development. The most important question that can be asked about the value of schooling is: How much does it have to do with the individual's later growth and development?

Bunch's investigations on the permanence of transfer effects are significant, (1), in calling attention to a very useful measure of retention that had not generally been recognized as such a measure, and (2), in discovering that these effects give evidence of much greater permanence than other products of learning. Doubtless the latter discovery will be construed as a happy circumstance by the educator.³

Retention of school learning in an exact and identifiable form decreases in importance as the individual grows older. This brings us to one of the limitations of the investigations of retention of such learning, at least a limitation in the significance of the results. The procedure usually followed is that of administering a battery of tests covering a given subject-matter field, say American history, at the beginning of a course and again at the end

³ M. E. Bunch, "The Amount of Transfer in Rational Learning as a Function of Time," *Journal of Comparative Psychology*, 22 (1936), 325-37; M. E. Bunch, "Transfer of Training in the Mastery of an Antagonistic Habit after Varying Intervals of Time," *Journal of Comparative Psychology*, 28 (1939), 189-200, and "A Comparison of Retention and Transfer of Training from Similar Material after Relatively Long Intervals of Time," *Journal of Comparative Psychology*, 32 (1941), 217-31.

of the course, the difference between initial and final scores being taken as a measure of learning. The pupils are then divided into three or four equated groups, each of which will be re-examined by the same battery of tests after varying intervals, say from 4 to 24 months. The difference between the learning and the retention scores represents the amount forgotten. Strictly, the score obtained at the end of the semester is also a retention score. So, actually, a comparison is made between the amount of material retained at the end of a semester with that retained 4, 8, 16, and 24 months afterward, or after other intervals as required.

Also, a battery of tests that affords satisfactory evidence of achievement in a course is not necessarily a satisfactory measure of retention when administered 12 or 24 months later, especially if it requires information that is detailed and highly specific to the content of the course. An examination that is functional in character would in many respects give a more valid picture of the retention of academic learning. Skill in interpretation of data, reading comprehension, knowledge of where and how to find information, ability in generalizing and in drawing inferences and conclusions, are criteria in the light of which retention of course material should be weighed.

The late 1920s and the 1930s saw considerable experimentation in retention of school learning. A few investigations are cited here for illustrative purposes. Johnson investigated the retention upon the part of university students of material learned in a course in botany. Test scores earned at the end of the course were compared with those of three comparable groups who took the test after lapses of 3 months, 15 months, and 27 months, respectively.⁴ Figure 13 gives a graphic representation of retention in median and Q_1 and Q_3 values in score points, for the three time intervals.

Other investigations at the college level, which have yielded quite comparable results, are those by Cederstrom and Greene

⁴ P. O. Johnson, *Curricular Problems in Science at the College Level* (Minneapolis: University of Minnesota Press, 1930), pp. 64-104, and also "The Permanence of Learning in Elementary Botany," *Journal of Educational Psychology*, 21 (1930), 37-47.

in zoology, Eurich, Jones, and Watson ⁵ in psychology, and Greene in physics and chemistry. Frutchey has published the results of an investigation of retention of high-school chemistry, in which tests designed to measure attainment in various objectives were administered at the beginning of the course, at the end of the course, and again a year later. The results in terms of the percentage of the gain that was retained are shown in Table XXVII.⁶

TABLE XXVII

RETENTION, AFTER ONE YEAR, OF GAIN MADE IN A
COURSE IN HIGH SCHOOL CHEMISTRY

<i>Objectives Tested</i>	<i>Percentage of Gain Retained</i>
Knowledge of facts	84
Application of principles	92
Terminology	66
Symbols, formulas, valence	70
Balancing equations	72

Frutchey's investigation is similar to one reported by Tyler.⁷ His results are also similar in respect to the general finding that memory for terminology showed the greatest loss. Tyler's students (in college), lost within a 15-month period of no formal work in zoology 77 per cent of the gain achieved in "naming animal structures pictured in diagrams." In "interpreting new experiments" the loss was 25 per cent; and in "applying principles

⁵ J. A. Cederstrom, "Retention of Information Gained in Courses in College Zoology," *Journal of Genetic Psychology*, 38 (1930), 516-20; E. B. Greene, "The Retention of Information Learned in College Courses," *Journal of Educational Research*, 24 (1931), 262-73; A. C. Eurich, "Retention of Knowledge Acquired in a Course in General Psychology," *Journal of Applied Psychology*, 18 (1934), 209-19; H. E. Jones, "Experimental Studies of College Teaching," *Archives of Psychology*, 10 (1923), Whole No. 68; R. I. Watson, "An Experimental Study of the Permanence of Course Material in Introductory Psychology," *Archives of Psychology*, 32 (1938), Whole No. 225.

⁶ F. P. Frutchey, "Retention in High-school Chemistry," *Journal of Higher Education*, 8 (1937), 217-18.

⁷ R. W. Tyler, "Permanence of Learning," *Journal of Higher Education*, 4 (1933), 203-04.

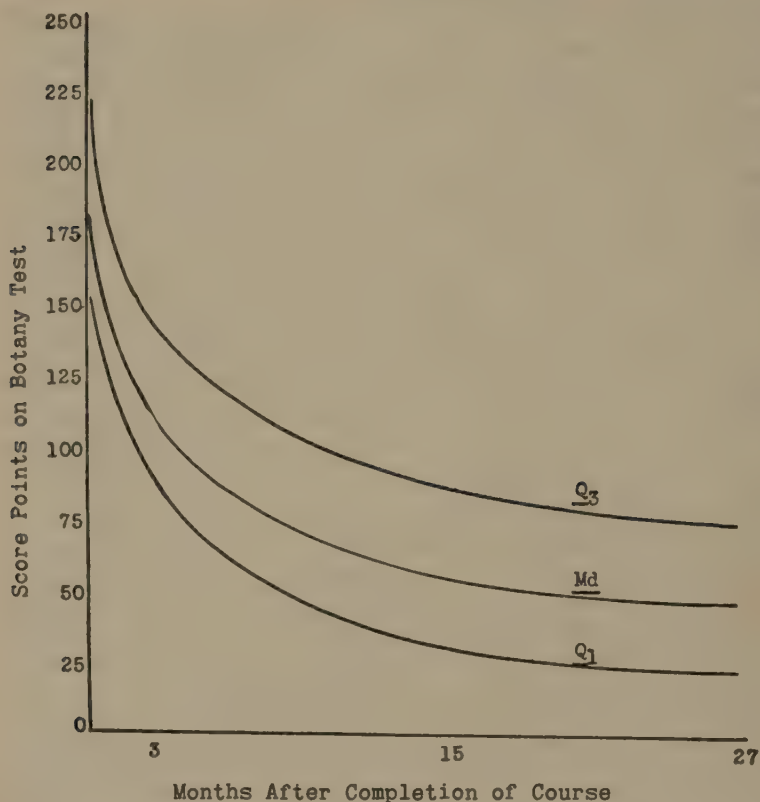


Fig. 13. Retention of botany as measured by repetition of examinations 3, 15, and 27 months after completion of course

to new situations," .7 per cent. It is indicated that the retention of ability to use scientific apparatus and to evaluate critically scientific experiments, both of which are objectives of courses in science, is relatively high.

Retention of Growth

It is obvious, then, from the foregoing that forgetting, a great deal of forgetting, is a common rule of life. Perhaps because we

have learned to live with it, or because we know others are subject to the same rule, we are not particularly wont to make apologies for it. In fact many find it a convenient excuse. Apparently it is easier to say "I don't remember" than "I don't know." The former may carry with it the veiled subtlety that "I once knew."

Actually, the question of individual differences in retentiveness has not been carefully investigated. We know, of course, that retentiveness is positively related to mental ability, to age, and to a number of variables. But it is not known to what extent individuals matched in age and mental age, education, and so on, vary in ability to remember what they have learned. The relationship between retention and mental ability does not appear to be so close as to obviate substantial differences. The fact remains that most persons are quite ready to admit to deficiencies in memory. No such readiness is encountered in admitting to obtuseness, or to being a little on the dull side.

Doubtless all will agree that forgetting is a terrible inconvenience. It also seems obvious that many persons, when it suits their work or other purposes, are able to acquire a faculty for remembering certain things remarkably well. But let us consider the question of how serious the proclivity toward forgetting is as it concerns the development of the human mind.

The purpose of course content in science, literature, history, and the rest is to further the mental development of the pupil. The purpose is to produce an educated person. Is his education undone in proportion as he forgets the content? In a sense, we are faced with the question of whether or not it is better to have learned and lost than not to have learned at all! Indeed, if we cannot endorse a positive answer, it is difficult to see how we could justify our concern about scholarship on the part of our students. This issue is discussed further in the ensuing chapter, in which the question of how education contributes to the development of the mind is treated. Attention has already been called to the fact that one very substantial criterion of the value of a period of schooling is the use that is made of it in further intel-

lectual growth. After a few years a professor's knowledge acquired in his graduate days ceases, in a sense, to be of much use to him. It is not of much use because he has forgotten so much of it. But this is largely because he has ceased to use it. He has, so to speak, grown beyond it. What is equally significant is the fact that without the graduate training he could not have grown beyond it. Part of the "growing-beyond" results from the fact that his field of instruction grows, but another part results from the fact that *he* grows.

Morrison has made the point that true learning, which he defines as "intellectual growth," cannot be forgotten, any more than a man can ungrow himself physically.⁸ The writer is inclined to feel that there is a great deal in this idea, although he does not wish to insist upon a strict interpretation of it. A person can certainly cease to grow and, in the intellectual field, it is difficult to see how in doing so he could avoid some shrinkage. This idea puts memory in a different light from that suggested by such terms as "recall" and "recognition." It is difficult to see how a student could spend four years in high school and four years in college in successful study of a field of knowledge—science or literature, for example—without undergoing some serious changes in mental make-up. Actually, he could not undo the changes if he tried.

Conditions of Retention

Memorization does not occupy the position in schools it once held. Today teachers are more interested in the kind of educational growth Morrison was writing about. Relatively less time is devoted to the teaching of the skills and to the exact learning of a body of isolated factual information. The term "efficiency" as applied to teaching has assumed a somewhat different meaning. Even so, the question of retention of what is learned in school is a very important one. Moreover, we have a wealth of knowledge

⁸ H. C. Morrison, *The Practice of Teaching in the Secondary School* (Chicago: University of Chicago Press, 1931).

concerning retention. This knowledge contributes to the understanding of the human mind. Accordingly the next few pages will discuss rather fully some of the conditions of remembering and retention and the experimental work pertaining to them.

Review. Let us take it for granted that review is one of the significant conditions of retention. If reviews are intensive enough and frequent enough, material may be retained at its original level. Some educators have eschewed review because of certain undesirable connotations, particularly because of its mechanical aura. In one of its meanings review does undeniably suggest repetitive, verbalistic practice. Perhaps teachers can all agree that, except possibly in spelling and in the computation skills and in the case of certain items of detailed knowledge, this form of review should generally be avoided. At least, there are ways of implementing review that are much more in line with progressive principles of education.

(1) *Objectives of review.* We should not be deceived by the apparent simplicity of the term "review." In reviewing a spelling lesson or simple addition and subtraction facts, review may be a *re-view*, a looking back. But there is another meaning of review—namely, *critical examination*, as when one reviews a book or the literature pertaining to a particular topic. This usage is hardly consonant with the meaning of "review" in school. However, by a slightly different phrasing—*critical re-examination*—this concept may be made applicable to teaching situations. Intelligent review of content material may be, and should be, made the medium of *gaining new insight* as well as looking back at concepts and understandings already gained and fixing them more firmly in mind. Review of a unit of instruction may be made to serve the purpose of *integrating* the content of that unit with a view to attaining *useful generalizations*. It may also serve to relate a unit of instruction with a previously studied unit, with the result that the understanding of both units is enhanced.

Review provides an opportunity for thinking critically about the material of instruction. It should be realized, too, that use in a new situation of material previously learned is also a review.

Review does not have to be formal, repetitive practice, as in catechetical learning. Moreover, the material of instruction may be so well integrated as to make formal review unnecessary.

(2) *Methods of implementing review.* Our present interest lies chiefly in two problems: methods of reviewing and temporal distributions of review exercises. In general, methods may be classified under two heads: *symbolical* review, as in recall, and review by *reimpression*, as in rereading and relistening. It is important to observe this distinction, because the optimal temporal point of reviewing is related to method.

Review by reimpression is a pretty obvious method and needs only to be mentioned. A pupil utilizes this method when he reads again at a later date a lesson previously prepared. On the other hand, there are various ways of implementing symbolical review. Direct recall, already mentioned, is one. By frequent indulgence in this form of symbolical practice, a person can virtually prevent forgetting. Although direct formal recall has a place in education, particularly in the mastery of specific items of factual information, as in learning the names of bones and muscles, it is of interest chiefly as a psychological phenomenon rather than as a teaching method. As a general thing, in connection with learning in school we wish to have our pupils *think* about the material they have studied. It is understood, of course, that in order to accomplish this, pupils will practice recall; but it should be recall for thinking, for understanding, for organizing and systematizing, not just recall.

Recall for thinking provides for maintenance by use and application. It accomplishes all that formal review does and at the same time serves other important educational purposes. It helps to organize and integrate knowledge and thus foster generalization. Teachers would render their pupils a great service if they could lead them to form the habit of consciously applying to each learning situation data learned in other situations. Correlation, integration, and systematization are accomplished, if at all, in the minds of the pupils. It does not necessarily follow that because the history teacher and the literature teacher happen to

be teaching at the same time a common period of history the learners will make much use of one in studying the other. Here again it should be noted that "reaction to," "confirming responses," "reinforcement" are requisite conditions of learning. The student of literature should avail himself of every opportunity for applying the facts learned in his history. The same may be said of reviewing mathematics in the study of physics. This is necessarily accomplished to some extent; but if it is consciously done, even to the extent of formally stating the mathematical applications, learning, which might be much better done by systematic planning, is not left to chance. A student of education can use his methods courses as a means of consciously reviewing his psychology, with the result that his understanding of both will benefit.

Moreover, within the framework of a single course of study review may be mediated by the application of information acquired in one part of the course in attacking another part. This application should not be left to chance or the whim of the pupil, but should be provided for as a step in the process of teaching. This step is illustrated, for example, in some of the modern textbooks in high-school mathematics, in which the pupil is frequently called upon to state the previously learned principles involved in a given operation.

The good student is likely to be a pretty shrewd individual. He makes intelligent use of his opportunities to learn. Let us turn to one of the methods of teaching the English language—the reading of masterpieces. It is a notorious fact that a pupil can read an enormous amount of such material with comparatively little profit—if the requisite psychological conditions of learning are not met. When the proper conditions are met, such reading can form the basis of genuine learning. One essential condition is that good usage be recognized and reacted to as such. If a pupil happens to be concerned with punctuation, he should be observant of punctuation, and should justify in his own mind the punctuation used—and might go so far occasionally as to recall a rule governing a case. Likewise he should react to the various

elements that go into good literature, diction as diction, syntax as syntax, style as style, and so on, applying wherever possible his knowledge of composition. As the reader thus applies his previous learning to a *present situation*, the reading of masterpieces may be made the basis of learning the English language. In a learning situation an individual learns what he practices, that is, what he reacts to. One of the things meant by literary appreciation is an understanding of what has gone into a production.

Other available and defensible means of inducing review are the *summary*, the *class discussion*, and the *act of taking tests*. They are available because they are procedures over which the teacher has a certain amount of control. They are defensible because they avoid, or can readily be made to avoid, the mechanical features of review so common in the memoriter method of past generations. The summary may be made to co-ordinate recall, re-examination, and organization. The test and the class discussion may be used to induce critical thinking as well as recall.

(3) *When to review*. A recommendation of long standing in educational psychology is that the initial review should come soon after learning, on the same day according to one author; and that of several reviews, the initial ones should be frequent—that is, closely spaced—with a longer interval of time elapsing between successive reviews. This suggests that of several review exercises the time of their occurrence should be in arithmetical ratio. Lyon, Thorndike, Starch, Gates, Jordan, and others have taken this position. This recommendation is deduced from the Ebbinghaus curve of retention.

The practical bearing of the results obtained on education in general is that when associations have once been formed they should be recalled before an interval so long has elapsed that the original associations have lost their “color” and cannot be recalled in the same “shape,” time, and order. In general it was found that the most economical method for keeping material once memorized from disappearing, was to review the material whenever it started to “fade.”

Here also the intervals were found to be, roughly speaking, in arithmetical proportion. For similar reasons the student is advised to review his "lecture notes" shortly after taking them, and if possible, to review them again the evening of the same day. Then the lapse of a week or two does not make so much difference. When once he has forgotten so much that the various associations originally made have vanished, a considerable portion of the material is irretrievably lost.⁹

Subsequent experimentation has justified Lyon's recommendation for one kind of review, recall, or symbolical review. In this category falls also review by the aid of lecture or reading notes. Such notes are not, as a rule, very complete, and have as their principal function the stimulating of recall. On a priori ground one may infer that the review value of recall will stand as some function of the amount of previously learned material that is recallable, and that when all is lost beyond recall, review attempts will avail but little. Experimentation has confirmed this inference.

Recent investigations by Spitzer, Sones, Spencer, and Freeburne corroborate Lyon. Spitzer determined the effect on retention of taking a multiple-choice test at varying intervals after the presentation of the learning material. His sixth-grade subjects were divided into several comparable groups ranging from 266 to 369 per group. Achievement was measured by means of a 25-item, multiple-choice test. The results are shown in part in Table XXVIII and in Figure 14. In both, B refers to Test B, the criterion test; the score following B_1 is the score achieved the first time Test B was taken; B_2 and B_3 , the scores achieved the second and third time the test was taken. The numbers along the top of the table signify the time at which the test was administered.¹⁰

It is seen that the mean score of Group VIII on the 63d day after the original presentation of the material is 6.4. This group had not previously taken the test. Since the groups were shown

⁹ D. O. Lyon, "The Relation of Length of Material to Time Taken for Learning, and the Optimum Distribution of Time," *Journal of Educational Psychology*, 5 (1914), 155-63.

¹⁰ H. F. Spitzer, "Studies in Retention," *Journal of Educational Psychology*, 30 (1939), 641-56.

TABLE XXVIII

MEAN SCORES ON TEST B AS ADMINISTERED AT VARIOUS
PERIODS AFTER LEARNING

Mean Score on Pre-		Time in Days at Which Test Was Given						
		0	1	7	14	21	28	63
Group	test							
I	15.03	B ₁ 13.2	B ₂ 13.1	.....	.....	B ₃ 12.2	.....	.....
II	15.05	B ₁ 13.2	.....	B ₂ 11.84	.....	.....	.....	B ₃ 10.7
III	15.00	.....	B ₁ 9.6	.....	B ² 8.9	.....	.....	.....
IV	15.00	.....	.....	B ₁ 7.9	.....	B ₂ 8.2	.....	.....
V	15.04	.....	.....	.....	B ₁ 7.0	.....	B ₂ 7.1	.....
VI	15.04	.....	.....	.....	.....	B ₁ 6.5	.....	B ₂ 7.1
VII	15.00	.....	.....	.....	.....	.....	B ₁ 6.8	.....
VIII	15.03	.....	.....	.....	.....	.....	.....	B ₁ 6.4

to be comparable, we may regard the variations in the testing procedures as being responsible for the differences in test performance. Thus we may attribute the difference between 6.4 achieved on the 63d day by Group VIII and 10.7 achieved by Group II to the fact that the latter group had previously taken the test. Moreover, the effect of the temporal position at which the test is administered may be gauged by the achievement of the various groups. For Group VI we note that the effect of the first testing on the second is negligible. Here the first test was taken on the 21st day. For Group IV we see the mean performance on the 7th day without there having been a previous reaction to the test; by comparing this with the mean performance of Group II on the 7th day we may see the effect of a test response levied immediately after learning. Various comparisons of this kind can be made, all of which show that the effect of the first test response on the second decreases as the time between learning and the securing of the first test response increases. Groups I and II, who took the test immediately after learning, benefited most from the test response. Spencer, who repeated the conditions of this investigation, with the exception that the learning

material was presented orally, confirmed Spitzer's results.¹¹ The significance of these results lies not so much in showing that the exacting of test responses has review value, although this is important, as in showing that the effectiveness of this kind of review is inversely related to the time elapsing between learning and reviewing.

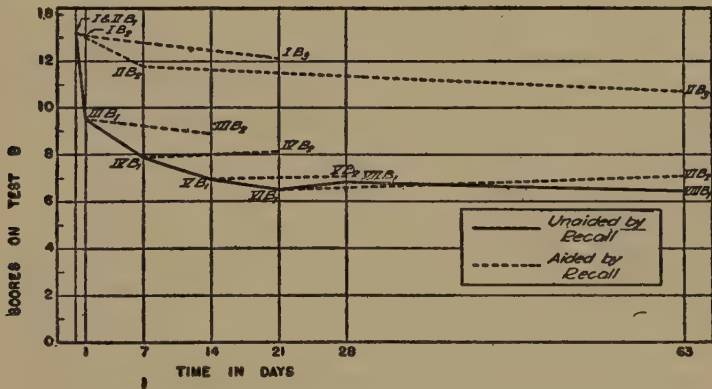


Fig. 14. Curves of retention for the entire population when the amount retained is expressed in raw scores

Sones and the author carried out an investigation the design of which was (1) to compare a test response and a rereading with respect to their review value, and (2), to determine whether or not the effectiveness of a rereading review also varies with the temporal position at which it is introduced.¹²

This experiment compared the two *kinds* of review at three *temporal positions*. The review periods took place on the 1st and 3d days—Position I; on the 8th and 15th days—Position II; and on the 15th and 17th days—Position III. The subjects, seventh-grade pupils, were divided, within each of the 48 school classes,

¹¹ E. M. Spencer, "The Retention of Orally Presented Materials," *Journal of Educational Psychology*, 32 (1941), 641-55.

¹² A. M. Sones and J. B. Stroud, "Review, with Special Reference to Temporal Position," *Journal of Educational Psychology*, 31 (1940), 665-75.

into six randomly selected methods groups. The methods groups were compared by scores achieved on a 40-item, 4-response criterion test administered in all cases 42 days after the original learning exercise. Methods Group I reread at Position I, III at Position II, and V at Position III; Methods Group II responded to a multiple-choice test at Position I, IV at Position II, and VI at Position III.

This experiment corroborated Spitzer's in finding that the review value of a test response decreases as the time between learning and its induction increases. On the other hand, the effectiveness of rereading review increased slightly, but not significantly, under the same conditions. At the first position, the test response was reliably more effective than rereading. At the last position, rereading was reliably more effective than the test response. At the intermediate position, rereading had a slight advantage over the test response, but the difference is not significant.

These investigations confirm the prediction of Lyon that for optimal benefit review exercises should be introduced soon after learning if such exercises are symbolical in character. Since it is true that symbolical review decreases in effectiveness as some function of elapsed time—a condition that also should apply to lecture and reading notes—it is easy to see the folly of depending upon another's notes for one's education.

In these investigations, learning was not carried to a very high level. With material learned to a relatively high level, as to a criterion of one or more correct repetitions, like the typical procedure in memory experiments, it is possible that review by what we have called reimpression would also be affected by temporal position. There is a suggestion of this in an investigation by the writer and Freeburne.¹³ This investigation had, as one of its objects, the testing with memory materials (paired adjectives)—learned to a criterion of one correct repetition—the findings of Sones and the writer with prose substance. The latter material

¹³ J. B. Stroud and M. Freeburne, "Symbolical Practice," *Journal of Educational Psychology*, 33 (1942), 65-71.

was incompletely learned by all, and learned very little by some. Learning and retention were measured by means of an objective test, and the taking of such a test constituted the medium of symbolical review. In the experiment by the writer and Freeburne the more rigorous conditions of the laboratory were maintained. Symbolical review was mediated by direct recall.

Review by recall one day after learning yielded a mean score of 9.0 items (out of 14), two days afterward. Review by re-impression yielded a mean score of 10.4 under otherwise similar conditions. Review by recall 14 days after learning yielded two days afterward a mean score of 3.1, whereas review by rereading after a like lapse of time yielded a mean score of 8.1, likewise two days afterward.

In large measure, this investigation confirms for laboratory material, learned under laboratory conditions, previous results on prose substance, learned under school conditions. It is of special significance that an objective test response functions as a review medium in quite the same sense as does direct recall, and that the general conditions of its effectiveness are the same.¹⁴

While there is no question that review is valuable educational procedure, it should also be appreciated that there are inefficient, monotonous, and uninteresting methods of reviewing. However, just as indefensible is the refusal to capitalize on this important principle of learning because it has been abused. As previously indicated, it is seen at its best *when material previously learned is recalled, or, if need be, consulted anew, for purposes of attacking a problem to which it is pertinent*. The so-called integrated course of study provides a feasible and effective procedure for implementing review, although for reasons already stated these advantages are not fully realized automatically.

Degree of learning. Again we return to the classical experiments of Ebbinghaus for our first, and perhaps our best, investigation of the relationship between retention and the degree of

¹⁴ Cf. G. Raffel, "The Effect of Recall on Forgetting," *Journal of Experimental Psychology*, 17 (1934), 828-38.

learning. In this experiment he learned, to varying degrees, as represented by 8, 16, 24, 32, 42, 53, and 64 readings, 70 double lists of nonsense syllables composed of 6 series of 16 syllables each; and he tested himself for retention 24 hours afterward in each case. The percentage saved is shown as follows, for the various amounts of practice:

No. readings	8	16	24	32	42	53	64
Percentage saved	8	15	23	32	45	54	65

In other experiments Ebbinghaus required about 30 readings, on an average, to commit lists of 16 syllables to a criterion of two perfect repetitions. The foregoing results show, with respect to the conditions under which they were obtained, virtually a one-to-one relationship between the number of repetitions and the scores achieved 24 hours later.

(1) *Overlearning*. The work pertaining to the relationship between retention and degree of learning is generally treated under the heading *overlearning*. This term is employed in psychology to signify any amount of learning or practice exacted of the subject over and above that required to reach a criterion.

It goes without saying that material well learned is remembered longer and more effectively than material poorly learned. There is, however, no a priori reason why a given number of repetitions levied after a list has been committed to memory should have the same effectiveness as an equal number imposed in the interest of reaching a criterion; nor is there any way of predicting, except on the basis of empirical data, whether successive overlearning repetitions increase or decrease in effectiveness.

Krueger's investigations of overlearning are perhaps the most systematic of any in the field.¹⁵ In his investigations learning to a criterion is taken as 100 per cent, and additional trials are expressed in the appropriate percentages of 100. The levying of trials beyond the criterion to a number equal to one-half the

¹⁵ W. C. F. Krueger, "The Effect of Overlearning on Retention," *Journal of Experimental Psychology*, 12 (1929), and 71-78; "Further Studies in Overlearning," *Journal of Experimental Psychology*, 13 (1930), 152-63.

number required to reach the criterion is designated as 150 per cent learning; twice the number required to reach the criterion, 200 per cent learning. His subjects learned lists of 12 monosyllabic nouns by the method of anticipation.¹⁶

The relative effectiveness of the three degrees of learning was measured by retention tests made by the methods of anticipatory recall and relearning exacted at varying intervals of time after learning: 1, 2, 4, 7, 14, and 28 days. The subjects learned different lists of words for each experimental condition. Thus as an additional feature Krueger was able to determine the effect of the length of interval between learning and testing for retention upon the relationship between amount of overlearning and amount retained. Table XXIX summarizes, in part, the findings. The fact that the lists were fairly uniform as to difficulty is shown in Column 4. Column 5 gives the retention in percentage saved by the method of relearning, at each interval and for each degree of learning.

These results show quite clearly that overlearning enhances retention, but it is difficult to assess the precise relationship.

¹⁶ In the method of anticipation, much used in psychological laboratories, the items are presented one at a time by means of some exposure apparatus, such as a memory drum. Subsequent to the presentation of the complete list, the first item is again exhibited, whereupon the subject is asked to anticipate the second item within the regular exposure time, usually from 2 to 4 seconds. Whether or not the subject is successful in reproducing the second item within the time limit, the second item is shown, which is a signal for the anticipation of the third. The third in turn becomes a signal for the anticipation of the fourth, and so on until the list has been completed. The anticipation is vocal. When the last anticipatory attempt is made, the items in the list are exposed again, as before, without vocal anticipation. Experimentally, this is known as *presentation*. The anticipatory trials constitute one form of recall. Thus under the usual experimental arrangement, presentation and recall alternate until the criterion of learning (commonly one or two correct trials) has been reached. Thus it happens that the odd-numbered trials become presentations and the even-numbered, recalls.

When an experimental arrangement involves learning to a criterion and when, as is usually the case, the number of trials required to attain criterial learning becomes the measure of learning efficiency, it is customary to alternate presentation and recall trials in the manner just described, regardless of the experimental method used.

TABLE XXIX
EFFECT OF OVERLEARNING ON RETENTION

Interval in Days	Degree of Learning (%)	Trials Required to Learn Lists	Trials Required for 100% Learning	Per Cent Saved
1	100	4.25	4.25	21.73
1	150	7.00	4.40	36.15
1	200	8.86	4.43	47.10
2	100	4.40	4.40	13.40
2	150	7.40	4.85	33.45
2	200	9.60	4.80	42.05
4	100	4.55	4.55	3.40
4	150	7.30	4.70	29.75
4	200	9.20	4.60	32.30
7	100	4.45	4.45	1.75
7	150	6.30	4.15	23.15
7	200	9.10	4.55	27.55
14	100	4.40	4.40	1.65
14	150	6.95	4.50	20.80
14	200	8.50	4.25	25.45
28	100	4.65	4.65	1.50
28	150	7.40	4.85	20.50
28	200	9.50	4.75	25.10

When relearning is induced one day after learning, the three degrees of learning are about equally efficacious, trial for trial. However, for longer intervals between learning and relearning, 50 per cent overlearning was more efficacious per trial than learning; and 50 per cent overlearning had a slightly greater per-trial effectiveness than 100 per cent overlearning. In terms of absolute differences in percentage points the advantage goes likewise to 150 per cent learning, and by a wide margin. The differences between 150 and 100 per cent average about 20 points; those between 200 and 150 per cent, about six points.¹⁷

(2) *Overlearning in school.* Attempts to implement overlearning in school should not imitate the procedures of the psy-

¹⁷ Cf. N. B. Cuff, "The Relation of Overlapping to Retention," *Contributions to Education*, No. 43 (Nashville: George Peabody College for Teachers, 1927); C. W. Luh, *op. cit.*; E. C. Tolman, "The Effects of Underlearning upon Short and Long Time Retentions," *Journal of Experimental Psychology*, 5 (1928), 466-74.

chological laboratory. The laboratory worker is interested in general principles of learning. He is not trying to show how they can be applied in school. Teachers may depend upon the laboratory for information about the effectiveness of overlearning and the conditions upon which this effectiveness depends; but they should contrive to secure the advantages of these by means that are more in line with other principles of teaching and learning.

There is a great deal of overlearning in school as a natural consequence of instructional procedures. In drill work, for example, overlearning is accomplished with respect to the first items learned while other items are being mastered. The opportunity for overlearning is present in all reading, writing, ciphering, and spelling, both in school and out. As a matter of fact, there is no clear line of demarcation between overlearning and review, except for a difference in time. Actually, review, while it envisages more than overlearning, is one means of securing it.

In a very general sense there probably is some degree of overlearning in connection with the prosecution of all courses of study, as the pupil actually makes use of previously learned information in attacking new learning situations. For various reasons this form of overlearning has much to recommend it. It avoids monotony, it provides for practice in a useful situation, and conditions for the operation of the "reinforcing mechanism" are favorable. Attempts to "overpower" the learner by sheer dint of enforced repetition are likely to be relatively unproductive and uninteresting. In endorsing overlearning we need not likewise commit ourselves to laborious drill; and by the same token, we need not fail to take advantage of overlearning because of our disaffection for excessive drill. The advantages that accrue from such educational methods as *integration* and *correlation* are owing in no insignificant degree to their implementation of overlearning.

From the discussion in Chapter XII it should be clear that one effort to implement overlearning should be studiously avoided; namely, repetitive reading of lessons.

Relationship between acquisitive and retentive abilities. The problem involved here can be broken down into the following two questions:

1. How do slow and fast learners compare in retention of material learned to a criterion; that is, when degree of mastery is experimentally equal and amount of practice, as between the fast and slow learners, is unequal?

2. How do good and poor learners compare with each other in the retention of learned material when practice is equal and degree of mastery unequal? Also, what is the relationship between the amount learned in a given number of practices and the *percentage* retained?

(1) *Learning constant, practice variable.* The subject who requires 30 trials to reach a criterion has an opportunity to do more overlearning of the initially learned items in a list than does a subject who requires but 10 trials, for example. Despite this, the evidence stands against the slow learner's having any superiority in retention over the fast learner. From which we may infer that, trial for trial, the overlearning done by the fast learner is more effective than that done by the slow learner. However, if the saving method is used in reckoning the retention of fast and slow learners, a simulated advantage goes to the latter, even though they require, as they usually do, more trials to relearn. For example, if subject A acquires a list in 16 trials and relearns it in 6 trials at some distant date, his saving score will be 62.5 per cent. If B acquires the same list in 10 and relearns it in 5, his saving score will be but 50 per cent, though his relearning score is superior to A's. Saving scores should not be used in connection with this problem.

Müller and Schumann obtained a positive relationship between the time taken to learn a list of syllables and that taken to relearn to the same criterion 24 hours later.¹⁸ Ogden obtained comparable results with both nonsense and meaningful material;

¹⁸ From W. H. Pyle, "Retention as Related to Repetition," *Journal of Educational Psychology*, 2 (1911), 311-21.

"...rarely does the fast learner require more time for relearning than does the slow learner, and usually requires less." "The fast learner, then, has the advantage; learning, in the first place, in the shortest time; and relearning what he has forgotten in the shortest time."¹⁹

Pyle found that fast learners are superior in immediate memory for words, objects, pictures, syllables, and connected thought passages. This is, of course, a necessary outcome, since the *sine qua non* of fast learning (memorization) is good immediate memory. A person is a fast learner by virtue of good immediate memory.

Pyle also observed that when material had been learned to a criterion, differences in retention scores were much smaller than the differences in the number of trials required to reach the criterion. This finding of Pyle's confirmed an earlier observation made by Ogden. The latter found that individual differences in relearning time were much smaller than those in learning time. Pyle found that individual differences in amount recalled were much smaller than the differences in trials required to learn. For example, he obtained a ratio of 5:1 in trials required to learn to a criterion; and a ratio of 4:3 between the best and the poorest recall score.

The results of Lyon's investigation, presented in Table XXX, may stand as a summary of the foregoing paragraphs.²⁰ His subjects learned to a criterion the following materials: digits, syllables, words, prose, and poetry. It is seen that the saving scores favor slightly the slow learners and that relearning and percentage scores favor the quick learners.

(2) *Practice equal, learning unequal.* The condition implied in this heading more nearly meets that which the teacher has in mind when he raises the question of the relationship between acquisitive and retentive ability. Thorndike obtained a correlation of .55 between the immediate reproduction of a list of words

¹⁹ *Ibid.*

²⁰ *Ibid.*, p. 141.

TABLE XXX
RELATION OF QUICKNESS TO RETENTIVENESS

	<i>Time of First Learning, Min.</i>	<i>Time of Re- learning, Min.</i>	<i>Per Cent of Time Saved</i>	<i>Per Cent Recalled</i>
40 Grammar School Girls, Modal Age, 14				
Average Upper Half	13.2	5.0	60	37
Average Lower Half	20.1	6.9	64	28
24 Trade School Boys, Modal Age, 16				
Average Upper Half	11.4	4.2	59	35
Average Lower Half	19.2	7.3	60	26
60 High School Students. Both Sexes. Modal Age, 17				
Average Upper Half	12.4	4.8	62	39
Average Lower Half	21.5	7.0	65	31
132 Normal College Women Students. Modal Age, 21				
Average Upper Half	11.2	4.0	61	39
Average Lower Half	17.8	6.4	65	31
24 Asylum Attendants. Both Sexes. Modal Age, 25				
Average Upper Half	14.1	5.2	58	35
Average Lower Half	18.3	7.2	62	28
12 Clerks and Businessmen. Modal Age, 30				
Average Upper Half	12.2	4.4	61	37
Average Lower Half	20.0	7.1	67	30
16 Graduate Students and Professors. Men. Modal Age, 32				
Average Upper Half	11.1	3.8	61	41
Average Lower Half	16.9	6.1	63	33

The interval between first learning and relearning was, in the groups included in this table, one week for digits and nonsense syllables, and ten weeks for words, prose, and poetry.

presented once orally and reproduction on the following day.²¹ Gates found an average correlation of .82 between immediate scores and scores made 3 or 4 hours later on connected biographical material, and .70 on syllables, by grade-school pupils. He also obtained average correlations of .41, biographical material, and of .39, syllables, between immediate recall scores and the propor-

²¹ E. L. Thorndike, "The Relation between Memory for Words and Memory for Numbers, and the Relation between Memory over Short and Memory over Long Intervals," *American Journal of Psychology*, 21 (1910), 487-88.

tion of those scores earned after the interval.²² Henderson's results for the learning and retention of connected trains of thought point in the same direction, as do those of Dietze and Jones.²³

An investigation published by Norsworthy in 1912 attacked the problem in an interesting way. She caused groups of college students to learn a great many lists of German-English pairs—German words and their English equivalents—10 pairs per list. Each student studied 20 minutes per day for 5 consecutive days.²⁴ Within this period every student had memorized at least 200 pairs, some as many as 800 or 900. The lists were relearned twice after 2-day intervals each. English equivalents known at the outset, as determined by pretest, were subtracted from each student's score. After the study periods were over, 50 German words, selected at random from the list of 200 German-English pairs that every student had committed to memory, were used as a retention test. She obtained a correlation of .41 between the total number of pairs memorized and the percentage of the 50 test pairs remembered. The best ninth, whose members committed a minimum of 700 pairs, retained 76 per cent of the 50-word sample, while the poorest ninth, whose maximum was less than 300 pairs, retained but 46 per cent.

A well-planned investigation conducted by Gillette has corroborated in large measure all of the aforementioned investigations. This investigation is also of interest in that it found that fast learners both retain more and forget more than do slow learners. Thus we may conclude that learning ability and retentive ability are positively related.²⁵

²² A. I. Gates, "Correlations of Immediate and Delayed Recall," *Journal of Educational Psychology*, 9 (1918), 489-96.

²³ E. N. Henderson, "A Study of Memory for Connected Trains of Thought," *Psychological Monographs*, 5 (1903), Whole No. 23; A. G. Dietze and G. E. Jones, "Factual Memory of Secondary School Pupils for a Short Article Which They Read a Single Time," *Journal of Educational Psychology*, 22 (1931), 586-98; 667-76.

²⁴ N. Norsworthy, "Acquisition as Related to Retention," *Journal of Educational Psychology*, 3 (1912), 214-18.

²⁵ A. L. Gillette, "Learning and Retention, a Comparison of Three Experimental Procedures," *Archives of Psychology*, 28 (1936), Whole No. 198.

Intelligence. There is but little room for skepticism regarding the over-all relationship between intelligence and retentive ability. We know that intelligence and learning are closely related, by definition. One of the accepted definitions of intelligence is *ability to learn*. We have seen that learning and retentive ability are related. Another definition of intelligence is *ability to profit from past experience*, or, *to utilize past experience in meeting new situations*. This implies transfer of training, which in turn implies retention in a functional sense. Moreover, as will be seen in the subsequent chapter, transference is positively related to intelligence. Thus it should follow that intelligence is positively related to retentiveness. This prediction is corroborated by empirical data.

Gates obtained an average correlation of .44 between teachers' estimates of intelligence of grade-school pupils and the percentage of previously acquired sense material retained after 3 to 4 hours, and an average correlation of .35 with the same variables for nonsense syllables.²⁶ Lee correlated intelligence-test scores with immediate and delayed retention of pictures, words, forms, and syllables.²⁷ Obtained correlations between test intelligence and recall and recognition scores are shown in Table XXXI. The magnitude of the coefficients is certainly not great, yet for a single exposure period of only 50 seconds one would not expect it to be overly high.²⁸

Age. It is known that ability to learn increases with age from childhood to maturity, that mental age similarly increases, and that both decline in middle and old age (see Chapter XI). Moreover, it is known that learning ability and MA are positively correlated, and that learning ability and retentive ability are

²⁶ Gates, *loc. cit.*

²⁷ A. L. Lee, "An Experimental Study of Retention and Its Relation to Intelligence," *Psychological Monographs*, 34 (1925), Whole No. 157.

²⁸ Cf. J. A. McGeoch, "The Fidelity of Report of Normal and Subnormal Children," *American Journal of Psychology*, 36 (1925), 434-45; T. H. Pear and S. Wyatt, "The Testimony of Normal and Mentally Defective Children," *British Journal of Psychology*, 6 (1914), 387-419.

positively correlated. It should follow, therefore, that retentive ability reaches a maximum in the late teens or early twenties and should decline somewhat during middle age with greater proclivity during senescence. It is possible, of course, that there are specific differentiative effects of old age on retention. In which case the decline in retentive ability would be greater than the decline in learning and MA. In fact such appears to be the case.

TABLE XXXI

CORRELATIONS BETWEEN TEST INTELLIGENCE AND IMMEDIATE
AND DELAYED RECALL

<i>Time Interval</i>	<i>Material</i>	<i>Recall</i>	<i>Recognition</i>
30 seconds	pictures	.58	.30
" "	words	.55	.36
" "	forms	.23	.13
" "	syllables	.16	.32
24 hours	pictures	.46	.34
" "	words	.47	.24
" "	forms	.27	.26
" "	syllables	.29	.23

In a special handling of Henderson's data Thorndike *et al.* paired adult and grade-school children in amount of connected prose material learned under specified conditions. Scores on retention tests made four weeks later showed that the adults had forgotten more than the children.²⁹

Gilbert has published an illuminating article on this general subject. She compared 174 adults aged 60 to 69 with an equal number of young adults aged 20 to 29, on several different tests.³⁰ The two groups were equated on the vocabulary test of the 1916 revision of the Stanford-Binet scale. On all of the measurements

²⁹ E. L. Thorndike, *et al.*, *Adult Learning* (New York: The Macmillan Company, 1928), pp. 301-12.

³⁰ J. G. Gilbert, "Memory Loss in Senescence," *Journal of Abnormal and Social Psychology*, 36 (1941), 73-86.

fully significant differences in retention were obtained in favor of the younger group.³¹

Character of materials. (1) *Meaningfulness.* The question of meaningfulness of material is discussed in Chapter XII. The experimental data apply as well to retention as to learning. Materials that are easily learned, practice being constant, tend to be well retained. Material high in associative value is for that reason comparatively easy to learn and for the same reason is easily recalled, relearned, or recognized afterward. Logical material, material capable of meaningful organization or reduction to some kind of system, comes within the operations of transfer of training, operations that facilitate recall as well as learning. In the case of meaningful material the necessary cue stimuli are more easily manipulated (see Chapter X).

(2) *Affective quality.* The fact that the emotional quality of learning experiences influences their retention has long since been a matter of common-sense observation. Thus John Locke noted that "...those which naturally at first make the deepest and most lasting impression are those which are accompanied with pleasure and pain." During the experimental period in psychology, much of the interest in this problem has centered around the *bidirectional* theory of affection. This theory held that a pleasurable quality favors learning and retention, and that an unpleasant quality operates unfavorably. Pleasurable materials are certainly learned more readily and are retained better than are unpleasant materials. But both are more favorable to learning and retention than is emotionally indifferent material.³²

³¹ Cf. *Idem*, "Mental Efficiency in Senescence," *Archives of Psychology*, 27 (1935), Whole No. 188; E. B. Potwin, "Study of Early Memories," *Psychological Review*, 8 (1901), 596-601.

³² H. E. Jones, "Emotional Factors in Learning," *Journal of General Psychology*, 2 (1929), 263-72; A. Silverman and H. Cason, "Incidental Memory for Pleasant, Unpleasant, and Indifferent Words," *American Journal of Psychology*, 46 (1934), 315-20; H. D. Carter, H. E. Jones, and N. W. Shock, "An Experimental Study of Affective Factors in Learning," *Journal of Educational Psychology*, 25 (1934), 203-15; M. M. White, "Some Factors Influencing Recall of Pleasant and Unpleasant Words," *American Journal of Psychology*, 48 (1936), 134-39.

(3) *Skills and symbolical materials.* One occasionally encounters the statement that acts of skill, like skating, typing, and golfing, are retained more effectively than verbal or other symbolical materials. There is some truth in these observations. But on the whole the comparisons are such as to preclude generalization. In the first place, such acts as skating and swimming are in large measure reducible to something comparable to a general principle. There is not much to remember. In the second place, such acts are usually practiced to a high degree. Moreover, many of them can be performed approximately in a variety of ways. The verbal activity of speaking is retained quite as well as the manual activity of writing.

Fair comparisons between the retention of motor acts and symbolical materials can be made only in the event that both are practiced equally and are actually comparable as to length, complexity, amount of detail, and in the degree to which they permit of meaningful organization and the operation of transfer of training. When such conditions are kept constant, there is actually comparatively little difference between these two classes of material.³³

The influence of set to remember. It is well known that an active set to learn is more productive of learning than a set of passive receptivity. Peterson found that the difference between the two sets was greater after a lapse of time than when the comparison was made immediately after learning.³⁴ This finding suggests that an active learning set also influences retention favorably. The present problem is chiefly concerned with the effect of learning with the intent to learn and *remember* as compared with a set to learn. Boswell and Foster found that learning

³³ J. A. McGeoch and A. W. Melton, "The Comparative Retention Values of Maze Habits and of Nonsense Syllables," *Journal of Experimental Psychology*, 1929, Vol. 12 (1929), 392-414; F. N. Freeman and E. M. Abernethy, "New Evidence of the Superior Retention of Typewriting to that of Substitution," *Journal of Educational Psychology*, 23 (1932), 331-34.

³⁴ J. Peterson, "The Effect of Attitude on Immediate and Delayed Reproduction: A Class Experiment," *Journal of Educational Psychology*, 7 (1916), 523-32.

with the set to retain resulted in higher retention scores than learning under an immediate-recall set.³⁵ Thisted and Remmers studied the effect of long and short time sets. They found, for example, that retention after two weeks was greater under a two-week set than under a one-day set.³⁶

Effect of bias toward the material. The facts relative to the comparative retention scores earned on pleasant, unpleasant, and indifferent material are contrary, or seemingly so, to the prediction of the Freudian (bidirectional) theory of memory. However, an interesting turn has been given the problem by the work of Watson and Hartmann, Edwards, and Seeleman.³⁷ This work suggests that unpleasant material is more readily forgotten than pleasant and indifferent material only when there is *ego* involvement—when the material conflicts with an established *frame of reference*, that is, an attitude, a belief, a desire, and so on.

Edwards' investigation was designed to test the following hypothesis: *Experiences which harmonize with an existing frame of reference will tend to be learned and remembered better than experiences which conflict with the same frame of reference.* He read a prepared statement on the New Deal, about 2000 words in length, to a group of college students. One-half of the statements were pro-New Deal; the other half, anti-New Deal. A test consisting of an equal number of items covering the favorable and the unfavorable statements was administered afterward to three groups of subjects, one group favorable, another unfavorable, and the other neutral. It turned out that the favorably disposed group learned and remembered more of the favorable than of the unfavorable statements; with the unfavorably dis-

³⁵ F. P. Boswell and W. S. Foster, "On Memorizing with the Intention Permanently to Retain," *American Journal of Psychology*, 27 (1916), 420-26.

³⁶ M. N. Thisted and H. H. Remmers, "The Effect of Temporal Set on Learning," *Journal of Applied Psychology*, 16 (1932), 257-68.

³⁷ W. S. Watson and G. W. Hartmann, "Rigidity of Basic Attitudinal Frame," *Journal of Abnormal and Social Psychology*, 34 (1939), 314-36; A. L. Edwards, "Political Frames of Reference as a Factor Influencing Recognition," *Journal of Abnormal and Social Psychology*, 36 (1941), 34-50; V. Seeleman, "The Influence of Attitude upon the Remembering of Pictorial Material," *Archives of Psychology*, 36 (1940), Whole No. 258.

posed group the outcome was reversed. They learned and remembered more of the unfavorable statements. The differences are large and significant. Seeleman's results are in accord.

The Meaningful Character of Retention

Learning is a selective process. All of the elements in a learning situation are not learned with equal expediency. Learning is not a semipassive process of having impressions from without imprinted upon the mental organs. It is an active, dynamic process. The learner transfers to a learning situation, be it a casual observation, a dramatic event, or a formal learning exercise in the laboratory, innumerable effects of past experience. His more enduring habits and set, as well as motives that are operative at the moment, determine the aspects of the complex situation that will be dominant. *Learning is an analytical process.* As Woodworth suggests, a familiar figure is named, and an unfamiliar one compared with some other known figure or object, or the pattern is reduced to some kind of plan. "The new = the old with a correction."³⁸

Qualitative changes in retention. Just as learning is a selective process, so is retention; and selection in retention and forgetting is dictated by the same conditions as selection in learning. There is an extensive literature on the quantitative aspects of retention and forgetting. But there are some very important qualitative aspects also, aspects that reveal the *dynamic, intelligent* characteristics of memory.

In his studies of memory published in 1903, Henderson noted certain important qualitative changes in the materials reproduced by his subjects.³⁹ These are grouped by him under three heads: *regrouping, simplification, and introductions*. In reproducing the ideas of short passages (about 150 words in length), which had been studied for three minutes, his subjects showed

³⁸ R. S. Woodworth, *Experimental Psychology* (New York: Henry Holt and Co., 1938), p. 74.

³⁹ Henderson, *loc. cit.*

a tendency to bring together concepts of similar meaning even when presented in separate parts of the text—regrouping. He observed two types of simplification: condensation and modification. Ideas that were repeated in the text tended to be mentioned but once in the reproductions, and words were substituted for phrases. Modifications tended to be made by the fusion of two ideas, especially those having a somewhat common function. In all, *meaning* appears to be a ruling factor in the reproduction of the passages. “Tyranny” may be rendered “injustice,” “distressed the poor,” “trampled on the poor.” These are examples of what Henderson calls introductions.

Bartlett’s “effort after meaning” is evident in all reproductions. The sentence—“There was once, in the eastern part of Egypt, a king whose reign had long been a course of savage tyranny; long had he ruined the rich and distressed the poor”—may be reproduced in substance in various ways, but in all there is an attempt to reproduce the central ideas. There is nearly always some degree of orderliness. The reader can now convince himself of this by attempting to write the sentence without reading it again. He may not be able to reproduce more than half the words appearing in the sentence. There is likely to occur condensation, substitution of words, reorganization, and so on; but in all, the meaning of the sentence will tend to be preserved.

The reader remembers a unit of thought. Otherwise memory would be utterly chaotic, as for example in the following rendering of the sentence in question with 10 of the words omitted, by chance selection: “There was once in the eastern Egypt a whose had long been a of savage; had he rich and distressed the.” Insofar as could be predicted by the mere mechanical operation of *disuse*, reproductions something like this should be the rule.

Bartlett’s extensive investigations of recall and forgetting corroborate the foregoing.⁴⁰ Recalling a trend of events is really a process of *reconstruction*. The subject reconstructs the best pattern he can. He constructs a meaningful story and one that

⁴⁰ F. C. Bartlett, *Remembering: A Study in Experimental and Social Psychology* (Cambridge: University Press, 1932).

he thinks fits the form or pattern of the original, as he understood it, or else he says he does not remember. He may fill in many details from his past experience as a process of assimilation; he adds details because they are logically necessary to reconstruct the pattern as he observed it or now understands it after reflecting upon it. But in any case the general pattern is preserved. He attempts to reconstruct a coherent whole. Otherwise, his remembering is simply unintelligent. These observations accord with all of the experimental work on testimony.

Qualitative changes in visual forms. In the investigations of memory of visual forms, tests have usually been made by having the subjects draw, after varying intervals of time, previously observed figures. As Woodworth points out, the product is a function of the subject's ability to draw, as well as of his memory of the figure. Even so, certain discernible changes take place that are very illuminating and afford us further understanding of mental operations. In the first place, the reconstructed figures tend to be simpler and to show less detail than the observed figure. If, however, there appears in the figure some very striking or unusual bit of detail, this tends to be somewhat exaggerated in later reproductions. In addition to *simplification* there appears also a tendency to make *substitutions* and to alter the figures in the direction of a stereotype, some standard model that the observed figure resembles, this procedure being a form of *assimilation*. These three tendencies were observed by Philippe ⁴¹ in 1897 and by Kuhlmann in 1906.⁴² In addition, Kuhlmann noted a tendency toward *regularization*, such as equalizing lines not quite equal in the original, or making parallel the lines not quite parallel or perpendicular the lines not quite perpendicular.

Other investigators have noted a tendency for asymmetrical figures to be reproduced as symmetrical ones; or more generally,

⁴¹ J. Philippe, "Sur les Transformations de Nos Images Mentales," *Review Philosophique*, 43 (1897), 481-93.

⁴² F. Kuhlmann, "On the Analysis of the Memory Consciousness: A Study in the Mental Imagery and Memory of Meaningless Visual Forms," *Psychological Review*, 13 (1906), 316-48.

for poor figures to become better figures. Possibly these are instances of assimilation and regularization, already noted.

McGeoch sees in the aforementioned qualitative changes in reproduction the operation of "two of the great classes of psychological events," *motivation* and *transfer*. He points out that recall, in its qualitative aspects, is influenced not only by the motives that are operating at the time of learning, but also by changes in the motivating conditions that may take place between learning and later recall. Thus, as he says, recall is influenced by the character of the material and its interaction with the motivating conditions of the subjects and the effects of their previous learning.

Forgetting

Theoretically, all learned behavior is subject to the phenomenon of forgetting as a consequence of interruption of practice. In the dynamics of character and personality it will nearly always be difficult to determine whether discontinuance of a mode or behavior is the result of forgetting in the ordinary sense or of displacement by other habits. As a consequence of altered circumstances, forms of behavior and even of attitudes may cease to satisfy motivating conditions. Active unlearning may occur if by virtue of these altered circumstances the acts, attitudes, and so on now arouse anxieties. New modes of behavior may be learned which are diametrically opposed to the old ones, or which otherwise displace them.

Perhaps in some instances of experimental extinction (see Chapter X) active unlearning may occur—if we may assume that the nonrealization of an expected reward can have a punishing effect. On the other hand, it appears that in many experimental extinction situations acts disappear, are extinguished, spontaneously simply as a consequence of their not being reinforced when performed. Incidentally, this principle is of great importance in child-rearing practices. It is not assumed to be at all necessary to punish undesirable acts in order to dislodge them.

They tend simply to disappear when conditions of nonreward can be contrived.

All this implies that some forms of elimination of learned behavior are highly desirable and much to be sought after. This may apply to a significant amount of our verbal learning. Sometimes our information is wrong. Sometimes we have misunderstood it. Also we may have acquired attitudes, especially emotionalized ones, that seriously interfere with our learning certain things. In any case, unlearning and displacement are common problems in school situations. On the other hand, there is a great deal of forgetting that teachers would like to prevent. The rest of this chapter is devoted to a brief discussion of theories of forgetting.⁴³

Disuse: phenomenon and theory. Disuse, as an empirical law—by which is meant that forgetting is among other things a function of elapsed time—is as firmly established as any fact of nature. Some interval of time is a necessary condition to the normal processes of forgetting, and amount of forgetting is positively correlated with length of elapsed time.

It is not assumed, of course, that time does anything. It is necessary simply for the operation of other conditions. The theory of disuse as an explanation of forgetting holds that during periods of no practice forgetting occurs more or less spontaneously owing to a fading of neuromuscular impressions. This theory is not held in high favor today.

Altered mental set and context. The conditions denoted by this heading account for the “vagaries of memory.” It is a well-known fact that items may be recalled at one time and not at another. A given stimulus may call forth different reactions on different occasions, and the same reaction may be aroused by different stimuli. To account for these facts Carr has stated two general conditions that he calls *the law of variable objective context* and *the law of variable subjective condition* (see Chapter X).

⁴³ Excellent summaries may be found in J. A. McGeoch and A. L. Irion, *The Psychology of Human Learning* (New York: Longmans, Green and Co., 1952).

The former states: *The mode of responding to a given stimulating object tends to vary with all variations of the objective environment in which it is encountered.* The probability that a given stimulus will evoke a given learned response is also a function of the variable subjective condition of the individual, his train of thought, attitude, mood, purpose, or set.

Retroactive inhibition: phenomenon and theory. Retroactive inhibition has become a major subdivision of experimental psychology and as such supports a considerable body of theory. It has become systematically important.

That interpolated learning—learning interpolated between primary (original) learning and recall—reduces the measurable retention of the primary material is amply attested by experimental facts; and several of the conditions upon which the extent of the influence depends are now known. Retroactive inhibition has long since ceased to be a theory; it is an established fact. However, facts become the bases of other theories. Thus the phenomenon of retroactive inhibition is regarded as a theory of forgetting.

(1) *Rest and sleep.* Bigham appears to have been the first to study experimentally the effect of interpolated activity upon retention, as he sought to compare retention in “filled” and “vacant” intervals.⁴⁴ He found that retention of numbers, colors, forms, and words, presented both visually and orally, was somewhat better in vacant intervals than in filled intervals of the same length. In the filled intervals his subjects read newspaper text, or listened to its reading. Auditory filling was somewhat more detrimental to the retention of auditory content than to the retention of visual content; visual filling was slightly more detrimental to visual content than to auditory content—a finding that has been confirmed by Nagge.⁴⁵ Bigham concludes: “The filling of the intervals hinders the memory.”

Continuous with these investigations is the work of Jenkins

⁴⁴ J. Bigham, “Memory,” *Psychological Review*, I (1894), 453-61.

⁴⁵ J. W. Nagge, “An Experimental Test of the Theory of Associative Interference,” *Journal of Experimental Psychology*, 18 (1935), 663-82.

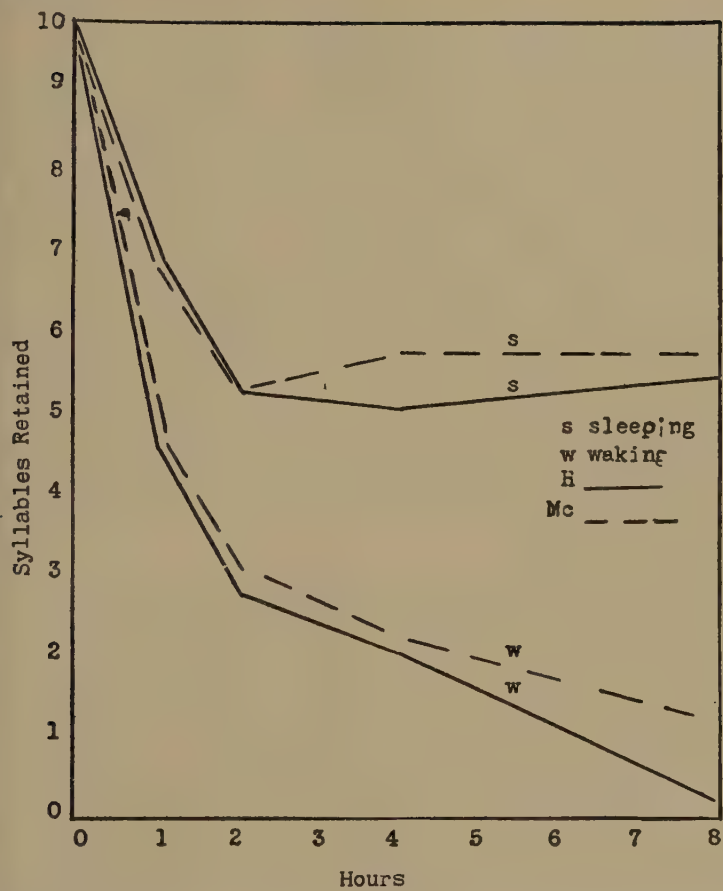


Fig. 15. Retention during sleeping and waking (Jenkins and Dallenbach)

and Dallenbach on retention in sleeping and retention in waking—continuous in the sense that sleeping represents a vacant interval and waking, normal waking at least, a filled interval.⁴⁶ The results, as depicted in Figure 15, show that retention in sleeping

⁴⁶ J. G. Jenkins and K. M. Dallenbach, "Obliviscence during Sleep and Waking," *American Journal of Psychology*, 35 (1924), 605-12.

is considerably greater than retention in waking. These findings have been confirmed by Van Ormer.⁴⁷

(2) *Conditions of similarity.* An outstanding fact of retroactive inhibition is that all forms of interpolated learning are not equally detrimental to retention. The extent of impairment is, among other things, a function of the degree of similarity between the original and interpolated materials. This condition was first investigated systematically by Robinson.⁴⁸ Similarity of material usually implies similarity of mental activity, although it is possible to vary the two somewhat independently. Thus Gibson and Gibson found that the amount of inhibition depends upon similarity of mental activity as well as upon similarity of material.⁴⁹ There are, of course, various kinds of similarity. The effects of varying degrees of *formal* similarity have been investigated most extensively. However, Haagen has demonstrated that variations in similarity in meaning have the same effects as variations in similarity in form.⁵⁰

The inhibiting effects of interpolated learning increase as the similarity between the interpolated and the original materials increases, but only up to a point. Materials may actually be so similar that interpolated learning has a facilitating effect. It also appears likely that some of the effects of interpolated learning can be forestalled by instructions or by judicious behavior upon the part of the learner—like noting elements of difference and similarity between the interpolated and the original lists.

(3) *Degree of learning.* The degree of learning of both the primary and the interpolated material is a factor in determining the amount of retroactive inhibition obtained. Within limits, the more thoroughly the primary material is learned, the less suscep-

⁴⁷ E. B. Van Ormer, "Retention after Intervals of Sleep and of Waking," *Archives of Psychology*, 21 (1932), Whole No. 137.

⁴⁸ E. S. Robinson, "The Similarity Factor in Retroaction," *American Journal of Psychology*, 39 (1927), 297-312.

⁴⁹ E. J. and J. J. Gibson, "Retention and the Interpolated Task," *American Journal of Psychology*, 46 (1934), 603-10.

⁵⁰ C. H. Haagen, "Learning and Retention as a Function of the Synonymity of Original and Interpolated Tasks," Doctor's Dissertation, State University of Iowa, 1943.

tible it is to the inhibiting effects of interpolated learning, and the more thoroughly the interpolated material is learned, the learning of the primary material being constant, the greater is the inhibiting effect.⁵¹

(4) *Temporal position of interpolation.* Robinson (in 1920) found the degree of retroactive inhibition to be independent of the temporal position at which the interpolated material was introduced. Specifically, he compared the influence of learning a second list of numbers during the first 5 minutes of a 20-minute interpolated period with that of learning the list during the last 5 minutes of the period. In both conditions, the subjects were occupied during the remaining 15 minutes with the reading of newspaper print. He found the two positions to have equal effect. Using longer interpolated intervals, McGeoch likewise found the amount of inhibition to be independent of the temporal position at which the interpolated material was introduced.⁵²

Müller and Pelzecker advanced an interesting theory of retroactive inhibition in 1900.⁵³ They posited a kind of maturing or perseverative phenomenon following an act of learning, during which the learning is more firmly established. Interpolated learning, as assumed by them, interferes with this perseverative process. The work of Robinson and McGeoch tends to disprove the perseveration theory. Naturally, the proposed perseverative tendencies would not go on indefinitely. It has generally been assumed that they would run their course within a few minutes and dissipate gradually. Thus, according to the expectation of the theory, the temporal position of interpolated learning should be important. They found that this is not the case. On the other

⁵¹ J. A. McGeoch, "The Influence of Degree of Learning upon Retroactive Inhibition," *American Journal of Psychology*, 41 (1929), 252-62, and "The Influence of Degree of Interpolated Learning upon Retroactive Inhibition," *American Journal of Psychology*, 44 (1932), 695-708.

⁵² *Idem*, "Studies in Retroactive Inhibition: II. Relationships between Temporal Point of Interpolation, Length of Interval, and Amount of Retroactive Inhibition," *Journal of General Psychology*, 9 (1933), 44-57.

⁵³ G. E. Müller and A. Pelzecker, "Experimentelle Beiträge zur Lehre vom Gedächtniss," *Zeitschrift für Psychologie*, I (1900), 1-300.

hand, different approaches to the problem have yielded some evidence of the validity of the perseveration hypothesis.⁵⁴

(5) *The transfer theory.* Some of the known facts of retroactive inhibition seem to be at variance with the perseveration theory. Others could scarcely have been predicted from it. The transfer theory is not embarrassed by either of these considerations. It encompasses equally well the facts known about similarity, degree of learning of both the original and the interpolated materials, and temporal position. One kind of deficiency in memory is simply erroneous responses. It has been shown that one type of detrimental effect resulting from interpolated learning is the intrusion of responses belonging to the interpolated list in the recall of the primary list.⁵⁵

The presence of overt intrusions is direct evidence of the operation of transfer effects. However, such intrusions are not to be taken as the only method of operation of transfer. The interaction between the primary and the interpolated lists is apparently broader in scope than that encompassed by overt intrusions. As McGeoch suggests, both positive and negative transfer effects can operate without the actual carrying-over of responses.

McGeoch and his colleagues have put forward an engaging formulation of a transfer theory known as *reproductive inhibition*. This phenomenon is really the converse of *associative inhibition* or the Mueller-Schuman law.⁵⁶ The latter may be schematized as follows:

⁵⁴ C. P. Duncan, "The Retroactive Effect of Electricshock on Learning," *Journal of Comparative Physiological Psychology*, 42 (1949), 32-44.

⁵⁵ F. McKinney and J. A. McGeoch, "The Character and Extent of Transfer in Retroactive Inhibition: Disparate Serial Lists," *American Journal of Psychology*, 47 (1935), 409-23; A. W. Melton and J. McQ. Irwin, "The Influence of Degree of Interpolated Learning on Retroactive Inhibition and the Overt Transfer of Specific Responses," *American Journal of Psychology*, 53 (1940), 173-203.

⁵⁶ J. A. McGeoch, "Studies in Retroactive Inhibition: VII. Retroactive Inhibition as a Function of the Length and Frequency of Presentation of the Interpolated Lists," *Journal of Experimental Psychology*, 19 (1936), 674-93; J. A. McGeoch, F. McKinney, and H. N. Peters, "Studies in Retroactive Inhibition: IX. Retroactive Inhibition, Reproductive Inhibition and Reminiscence," *Journal of Experimental Psychology*, 20 (1937), 131-43.

KOR-LAV
ZUV-HEJ
CIK-NOP

KOR-HUX
ZUV-TOB
CIK-MIJ

in which the forming of the association KOR-LAV makes more difficult the forming of the association KOR-HUX, and so on for the other items in a list. That is, when the association A-B has been formed it becomes more difficult to form an association between A and C. In *reproductive inhibition* we have the condition in which the probability of the recall of B, A acting as a stimulus, is reduced by the formation of the intervening association between A and C.⁵⁷

Warm-up phenomena. The last decade or so has seen the development of a considerable body of research on mental set as a condition of retention and forgetting. Thus loss of the set under which the material was originally learned has emerged as one of the recognized conditions of forgetting. By providing prior to recall or relearning trials some warm-up trials similar to the original learning in the activity required, but differing in content, it has been found that the retention scores can be increased, and by large and significant amounts.

In a psychological laboratory a memory experiment is rigidly controlled. Usually the subject is required to learn a fairly complicated list of material like adjectives or nonsense syllables. These are presented in what to the subject is an unusual way—by the method of *paired comparison* or the method of *anticipation*, for example. The lists are also presented by a particular kind of apparatus and at specified rates. Likewise, the conditions under which the subject makes his responses are strictly controlled as to both method and the time intervals in which they must be made. The purpose of these comments is to suggest that

⁵⁷ Cf. S. H. Britt, "Retroactive Inhibition: A Review of the Literature," *Psychological Bulletin*, 32 (1935), 381-440; M. E. Bunch and M. M. Winston, "The Relationship between the Character of the Transfer and Retroactive Inhibition," *American Journal of Psychology*, 48 (1936), 598-608; Sister M. F. L. Lahey, "Retroactive Inhibition as a Function of Age, Intelligence, and the Duration of the Interpolated Activity," (Doctor's Thesis), Catholic University of America, 1937.

loss of set and the compensating warm-up may be more important in the psychological laboratory than in real life. Even so, loss of set appears to be one of the significant conditions of forgetting. Common experience suggests that in our efforts to recall something that for the moment eludes us, one of the things we do is to think back to the original circumstances in an effort to establish a helpful mental set. We are sometimes surprised at the things we can remember when conditions are just right. One of these conditions seems to be a favorable mental set.

McGeoch and Irion suggest that the benefit from warm-up practices prior to recall is a function of "(a) the amount of warm-up activity, (b) the similarity of behaviors involved in the warm-up activity and the learning activity, and (c) the time interval between the warm-up activity and the recall."⁵⁸

ADDITIONAL REFERENCES

- Bernard, H. W., *Psychology of Learning and Teaching* (New York: McGraw-Hill Book Co., 1954)
- Deese, J. E., *The Psychology of Learning* (New York: McGraw-Hill Book Co., 1952)
- Gilliland, A. R., "The Rate of Forgetting," *Journal of Educational Psychology*, 39 (1948), 19-26
- Hall, J. F., "Retroactive Inhibition in Meaningful Material," *Journal of Educational Psychology*, 46 (1955), 47-52
- Lewis, D., "Motor Skills Learning," *Symposium on Psychology of Learning Basic to Military Training Problems*. Committee on Human Resources, Department of Defence, HR-HTD 201/1, 1953
- Pathael, L. L., Fitzpatrick, E. D., and Bischof, L. J., "A Comparison of the Extent of Retention Accompanying the Use of Three Teaching-Testing Procedures," *Journal of Educational Research*, 47 (1953), 65-70
- Tyler, F. T., "Concepts of Organismic Growth: A Critique," *Journal of Educational-Psychology*, 44 (1953), 321-42

⁵⁸ *The Psychology of Human Learning*, p. 453. The authors summarize the published research dealing with this topic.

XIV

THE IMPACT OF EXPERIENCE

The Mold of the Mind

For the White House the new year began in gloom. The President's wife spent a sleepless and painful night, and Mr. Adams, waking at daybreak, found the dawn overcast, the skies heavy and sullen. He prayed briefly, then fumbled for his Bible and turned to the Book of Psalms, reading slowly by the yellow light of his shaded oil lamp. "Blessed is the man that walketh not in the counsel of the ungodly, nor standeth in the way of sinners, nor sitteth in the seat of the scornful." On he read to the ultimate assurance: "For the Lord knoweth the way of the righteous: but the way of the ungodly shall perish."

The familiar words assuaged disappointments of four years. To an Adams, the first psalm seemed almost a personal pledge. "It affirms that the righteous man is, and promises that he shall be, blessed," he noted with precise gratification in his journal, and went to his desk for his usual early-morning work. As his pen began to scratch across the paper, the lamp, its oil low, flared for a moment, then flickered out. Mr. Adams sat in the gray light.

It was no year for righteous men: everywhere they sat in darkness. Two months before, General Andrew Jackson had been elected President of the United States. The ungodly were now in the ascendancy, and those who walked not in their counsels had little but Scriptures for consolation.¹

When the writer first read this passage he found it amusing. No doubt the reason he did so was the fact that he brought to the

¹ A. M. Schlesinger, Jr., *The Age of Jackson* (Boston: Little, Brown, and Company, 1946). Quoted by courtesy of the publishers.

reading a particular political and social philosophy acquired in his past life, as well as strong admiration for President Jackson.

As he read further in Schlesinger's book he found that on the last day of Old Hickory's life a man and a boy drove in great urgency through Nashville in a wagon and out along the turnpike toward the Jackson home. The man was Sam Houston, bringing his son, as he said, to gaze upon "so great a man" while he yet lived. To the man reading this, it seemed an altogether fitting tribute; but he would not be surprised to find that there are men who might find the latter event a little amusing. The same man would not be expected to find both the Adams and the Houston events amusing.

Thorndike has said that when confronted with a new situation, a man's habits do not retire to some convenient distance while new and mysterious forces direct his behavior. Behavior already associated with situations like it takes over. Somewhat to the same purpose James wrote: "Whilst part of what we perceive comes through our senses from the object before us, another part, and it may be the greater part, always comes out of our heads." Almost any situation in life, except for a young child, is met and reacted to in terms of past life—past learning, past thinking, perceiving, feeling, and so on. The same Senator McCarthy conducted the same Army hearings in the summer of 1954; for all practical purposes the same things came out of television sets all over the country. The people who viewed them did not see the same things. The things seen varied as widely as the education and the emotions of the viewers varied. Do forester, lumberman, poet, and camper see the same forest? The same science program may come out of tens of thousands of different radios. The listeners do not all hear the same things. An intelligent person with broad scientific training, depending upon the nature of his specialization, might be expected to reproduce the broadcast in substance at once, or to do so a week later. Another man, equally intelligent and competent but whose training and interests lay in a different direction, might be embarrassed by such an

attempt. In the 1940s thousands of young Americans spent some time in New Guinea. A few, no doubt, upon returning could give a useful account of, for example, plant life there. We would anticipate that they would be those who knew beforehand something about plants in America, or otherwise were trained persons.

Illustrations of this kind could be multiplied almost indefinitely. A person's interests, his powers of observation, or what he can learn when he really addresses himself to a learning task, are to a large extent a function of his prior training. Frequently situations in life are not encountered again in exactly the form met earlier. In other words, there are likely to be elements of novelty in most situations. Thus situations, learning situations or others, vary in familiarity. The extent to which experience gained in one situation is relevant to another situation is a function of the *similarity* between them.

Historically, the term "transfer of training" has been used to designate the effects of training in one situation upon performance in another situation. By custom a transfer situation always implies some element of novelty or dissimilarity. When a person utilizes the results of past experience in reacting to a situation that has in it some element of novelty, we can say that transfer of training has occurred. Since situations met are rarely exactly like any of those encountered before, transfer is commonly implicated to some degree in our mental reactions. There is a tendency today to use the term "generalization" as the equivalent of transfer.

What Do We Learn?

One of the dimensions of mental development is the learning of specific reaction patterns to specific situations. The factual knowledge at our disposal, much of what we call memory, and a host of manual habits are examples. The first development of mind is along this dimension, which may be called specificity of response. Indeed, any animal is capable of some development in this direction. The quickness with which an organism can acquire

such responses, and especially the complexity of response patterns that can thus be acquired, are functions of intelligence. This dimension of mental development is outside the concept of transfer of training. Quite soon in the course of mental development we can observe signs of the beginning of another dimension—the ability to adapt these specific reactions to situations other than those to which they were originally specific. This ability does come within the scope of transfer of training. The facility with which this is done is also a sign of intelligence.

Our best examples of this kind of adaptation are found in generalized knowledge and skill, as in the operations of mathematics. Perhaps counting is our fairest example of generalization. A child who has learned to count by counting pennies and pebbles finds that he can count chickens and ducks. Although originally he may have practiced on objects perceptible to vision, he can now count sounds, tastes, smells, or anything discernible by any of his senses.

The process by which we come by concepts has in it some of the elements of generalization. What we seem to have is a kind of totality not present in any of the separate experiences out of which a concept is formed.

Mental development consists . . . in equipping the individual with the power to think abstractly and to form general ideas. When the ends thus described are attained, transfer . . . has taken place because it is the very nature of generalization and abstraction that they extend beyond the particular experiences in which they originate.²

Thorndike has emphasized *similarity* as one of the prime factors in transfer. One function will influence another to the extent that the two functions have something in common; or as Thorndike said, when the two functions have identical elements. He recognized two kinds of identical elements: identity of content and identity of procedure. As a direct effect of practice on Task A, the learner acquires certain knowledge, skill, or other content

² C. H. Judd, *Psychology of Secondary Education* (Boston: Ginn & Co., 1927), p. 441.

which subsequently may be useful in the performance of Task B if A and B have elements in common. But as an indirect effect of practice on A he may also acquire certain other effects which may influence performance on other similar tasks. Indeed, these indirect effects may produce some of the most important results of education.

As a consequence of the student's successful pursuit of scientific studies, he will as a direct result acquire a knowledge of science. But he may also as an indirect result learn self-confidence, scholarly habits, respect for learned pursuits, good habits of work, and other values. On the other hand, a student may learn some things indirectly as a consequence of failing to learn directly; namely, attitudes of inferiority and insecurity. When learned, these indirect effects may persist, generalize, and affect his life in many ways.

This brings us close to the heart of the problem of transfer as an educational issue. For example, we would expect mathematical and scientific knowledge learned in the classroom to be applied, insofar as it is understood and remembered, to problems of life to which it is pertinent. But what about other products of study of science and mathematics, such as intellectual honesty, the scientific method, precision in measurement, and so on—do they generalize or transfer, let us say to nonscientific spheres of intellectual life? Does a scientist exercise a scientific attitude when he reads an account of a coal strike in the morning paper?

Perhaps there is no inner necessity for scientific traits of mind to generalize much beyond the field of science. Doubtless there are good scientists who are not very scientific when not employed about scientific matters. This may turn out to be proof rather than negation of transfer as a principle of mental life. What seems to play hob with generalization of scientific training is that there are also other attitudes and dispositions that have a strong propensity for generalizing—social and political prejudices, for example. There may not be many common elements between impartiality in investigation of enzymic action in a grasshopper egg and impartiality in weighing the question of admitting Red

China to membership in the United Nations. At least, training in the one is not tantamount to training in the other. It seems safe to assume that scientific training does generalize to some extent. What we have to be careful about is claiming too much. Perhaps there is no more reason to apologize for aiming to inculcate love of truth or scholarly attitudes or creativeness as by-products of teaching than for aiming to teach knowledge by a frontal attack. Actually, teachers do not do either as well as they wish. One can scarcely imagine an individual's devoting five, ten, or twenty years to the successful study of science, or any other learned field, and escaping with nothing more than knowledge and habits useful to him only in his field of specialization.

It is no idle fancy of popular observation that the clergyman always adopts habits of behavior and thought appropriate to his walk in life. Indeed, it has been charged that there are certain mental habits and ways of acting which go with the educational profession.³

Learning to Learn

One of the things we learn from practice is the ability to learn. This is really one of the prime effects of education. It is seen in the hierarchy of courses found in almost any field of learning, such as in the prerequisites listed in college catalogues. It is also seen in the fact that in learning successive samples of the same material of a constant level of difficulty, learning becomes progressively easier. If a man set about to memorize a 25-page poem one page at a time, he would find a marked reduction in the number of readings required per page between the first page and the last page. Likewise if he read a series of comparable textbooks in tenth-grade science, he would find them progressively easier, especially if he were not a science teacher in the first place.

Thus one kind of transfer effect that has been investigated rather thoroughly by psychologists is what is known as *within-class transfer*—transfer from list to list or task to task of the same

³ C. H. Judd, "The Relation of Special Training to General Intelligence," *Educational Review*, 36 (1908), 28-42.

class, one poem to another or one science textbook to another. Harlow has conducted with monkeys a series of interesting experiments on learning to learn. One of these experiments is described briefly as follows: ⁴ His subjects were eight rhesus monkeys that had been thoroughly tamed and taught to displace single objects to obtain food. Otherwise they were experimentally naïve. To the subjects, taken individually, was presented a tray containing two food wells. Each well was covered with a 3" x 3" block of plywood. Four hundred and fifty such blocks were prepared, on each of which was mounted a square of the same size "cut from colored and from black and white advertisements, photographs, and printed material found in popular magazines." The blocks could be discriminated one from another in terms of color, shade, and pattern of the paper mountings. A monkey was allowed to remove one well cover, and only one, in each trial. If he removed the right one, he obtained food.

In 50 per cent of the first trials both food wells were baited; in the other 50 per cent neither well was baited. Thus the first block removed on the first trial became a sign of food during subsequent trials, or in the other 50 per cent of the first trials, a sign of no food on subsequent trials. On the second trial the position of the stimulus object chosen on the first trial was maintained constant in 50 per cent of the cases and reversed in 50 per cent of the cases. On the remaining trials the position of the stimuli was alternated in such a way as to obviate position habits and alternation habits.

Under the procedure just described, 10 8-trial problems were presented each day for 45 days, making a total of 450 problems. A different pair of stimuli was used in each problem. In a situation of this kind we psychologists expect the monkeys to learn. On each problem we would expect more successful responses on the eighth trial, for example, than on the second trial. But what

⁴ H. F. Harlow and J. M. Warren, "Formation and Transfer of Discrimination Learning Sets," *Journal of Comparative and Physiological Psychology*, 45 (1952), 482-89. Cf. H. F. Harlow, "The Formation of Learning Sets," *Psychological Review*, 56 (1949), 51-65.

is striking, if not surprising, is the increasing rapidity of the learning as the animals progressed from problem to problem. On the first set of 50 problems the average success on the second trial was 56 per cent. Chance alone would have given 50 per cent success. The average success on the second trial for the last block of 50 problems was about 85 per cent. On the eighth and last trial on each problem of the first block of 50 problems, the average score was 61 per cent correct. On the last block of 50 problems, the average success on the eighth trial was about 96 per cent. The results are shown more fully in Figure 16. Certainly this is an impressive example of learning to learn. Harlow and Warren also found that the monkeys, trained on discrimination learning with the planometric stimuli just described showed large transfer effects from this training when subsequently required to do discrimination learning with stereometric stimuli—large as compared with the performance of other monkeys who had not had practice on the planometric stimuli.

The fact of transfer is not a psychological problem. It is a characteristic of mental development that learned behavior is not merely specific to the situation in which or the purpose for which it was learned in the first place. It generalizes, transfers. All general knowledge is of this kind. Thus transfer is a necessary concept in psychology.

Learning frequently overgeneralizes. A small child who in handling some flowers on a terrace is stung by a bee may show signs of fear not only of the bee but also of flowers and even the terrace, to use a frequently cited example. If one's ideas of the Finnish people are based upon acquaintance with a very limited number of people from that country, those ideas must be pretty undependable. One reason why many people feel so uncertain of their knowledge of present-day Russia is the realization that their information is incomplete. In teaching and learning overgeneralization is as much to be avoided as undergeneralization. The immature student is subject to both. Here again we see that it is the nature of general knowledge that it extends beyond the specific situations in which it was acquired. We can know only

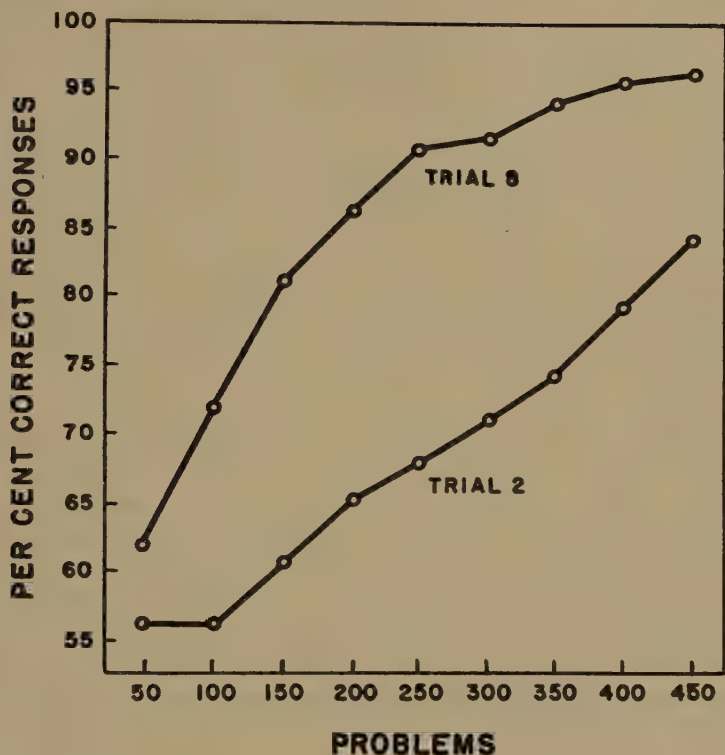


Fig. 16. Learning-set curves for percentage of correct responses on Trial 2 and Trial 8 for successive blocks of planometric discrimination problems

specific things. Our concepts, while derived from specific experiences, are never experienced as such. They do not exist except in our heads.

While maintaining that generalization is a necessary psychological concept and is one of the obvious facts of mental development, teachers should avoid claiming too much for it. The fact that the educative process is so slow and so long should call for caution. Formerly there existed in education, although chiefly

as a "straw man," a theory of mental development known as *formal discipline*. The supposition was that mental abilities or faculties can be trained formally. For example, practice in the memorization of poetry not only results in improvement in ability to memorize poetry and *similar* material, but also, according to the theory, results in the improvement of all memorial abilities. Thus the effect of training in tasks exercising a particular ability—memory, reasoning, and so on—was conceived to be formal, general, with respect to that ability as a whole, not *specific* to the task in question or others similar to it. The study of geometry was alleged to strengthen the faculty of reasoning; grammar and language were said to develop the faculties of perception and thought.

Actually, it is by the study of geometry, grammar, and language—and arithmetic, science, literature, history, and other subjects—that the mind develops. But it develops by equipping the individual with the knowledge and the habits of thought and work that are pertinent to the problems of life, not by the formal exercising of hypothetical faculties, the way that repeated flexing of a muscle will increase its diameter. If a person wishes to develop a muscle, it is probably as efficacious to lift one thing as another, provided they are equal in weight. In developing mental abilities one kind of experience is not as good as another. There is also another difference between mind and muscle. The increased strength of a muscle, although achieved by lifting rocks, is applicable to any activity requiring the use of that muscle. But there is probably little in common between reasoning in mathematics and reasoning in politics. The most astute thinker in political science might not be of much help in designing a bridge.

The best curriculum of the best system of education is one that trains the mind for the purposes to which it is to be put, or can best be put, in society.

Within-class and class-to-class transfer. In reality there are two orders, so to speak, of transfer. One concerns transfer from samples of one class to samples of another class. This order of transfer is investigated when, for example, the effect of practice

in memorization of nonsense syllables upon memorization of poetry is determined, or the effect of practice in discriminating tones upon discrimination of brightness. The majority of investigations in transfer relate to this aspect of the problem; and it is natural that they should do so, because experimentation in transfer grew out of the doctrine of formal discipline—which predicated class-to-class transfer.

Since successive samples of poetry or tones or shades of gray or syllables are not identical, it is legitimate to regard improvement accruing from practicing successive samples within a class as a transfer effect. This order has been called *within-class transfer*. For example, if in the memorization of 10 successive samples of poetry of equal length and difficulty, the last sample is memorized in less time than the first, it may be said that within-class transfer has occurred.

An individual can by practice improve his performance in nearly all learned activities. Literally hundreds of experiments have yielded volumes of incidental data on changes in facilitation in learning from sample to sample within a class. In many kinds of experiments subjects are brought to a practice level as a preliminary condition to the main experiment—a procedure that recognizes within-class transfer. Any experiment in which subjects memorize more than a single sample of a given class may contribute something to a knowledge of the effects of practice upon memorization. Meumann writes that improvement of memory has no limit—"a given memory function may be developed to a maximum degree by practice."⁵ Ebert and Meumann's subjects required from 19 to 34 repetitions to commit a list of 16 nonsense syllables at the beginning of training, and from 3 to 8 repetitions at the end. With prose material, from 17 to 38 repetitions were required at the outset; and from 5 to 14 at the end. In repeating the Ebert-Meumann experiment, Reed found that his subjects, by 10 to 18 daily practices, reduced the time required to commit lists of nonsense syllables to about one-third

⁵ E. Meumann, *The Psychology of Learning*, trans. by J. W. Baird (New York: D. Appleton-Century Co., 1913), p. 357.

of the original time.⁶ Incidentally, the practice curves in such experiments show negative acceleration. Improvement from the first to the second list is comparatively great.

Theorists have usually had in mind class-to-class transfer. But within-class transfer is also in need of explanation. *Identity in procedure*—one of the kinds of identity specified by Thorndike—might be made to cover the phenomenon in a very general way. Increased ability to pay attention, increased resistance to distractions and interferences, and a reduction in the number of activities that require *disruption* may be mentioned as instances. (The latter suggestion is in line with Guthrie's "all-or-none" or "one-trial" hypothesis of association forming—in support of which he calls attention to the large reduction in trials effected by Pavlov in his conditioning experiments by the use of a soundproof, lightproof laboratory and by the removal of the experimenter from the room.⁷)

Within-class transfer does not imply transfer from class to class. The presence of transfer with respect to successive samples of the same class does not ensure transfer from class to class. Were the latter always obtainable, we would be justified in speaking of *memory training*, *training the will*, and so on, in the sense of general training. Transfer from class to class may, of course, take place. But since it does so only under certain prescribed conditions, as for example, when the two classes are similar, we are not warranted in speaking of training as being general; that is, of its extending to all classes of memory or perception or reasoning, and the like.⁸

⁶ H. B. Reed, "A Repetition of Ebert and Meumann's Practice Experiment on Memory," *Journal of Experimental Psychology*, 2 (1917), 315-46.

⁷ E. R. Guthrie, "Conditioning: A Theory of Learning in Terms of Stimulus, Response, and Association," in *The Psychology of Learning* (National Society for the Study of Education.) Forty-first Yearbook (Bloomington, Ill.: Public School Publishing Co., 1942), Part II, Chap. I.

⁸ Cf. W. F. Dearborn, "The General Effects of Special Practice in Memory," *Psychological Bulletin*, 6 (1909), 44; W. G. Sleight, "Memory and Formal Training," *British Journal of Psychology*, 1911, Vol. 4 (1911) 386-457; cf. L. E. Thune, "Warm-up Effect as a Function of Level of Practice in Verbal Learning," *American Psychologist*, 5 (1950), 251; H. F. Harlow, "The Formation of Learning Sets," already cited.

Some Key Experiments

Transfer effects may be positive or negative, or both, or non-existent in measurable amounts. These effects may be seen readily in young children. The small child who has learned the principal parts of the verb "teach" may show negative transfer effects in forming the past participle of the verb "preach." Archer obtained evidence of marked transfer, positive and negative, in adding prefixes and suffixes after the base words had been studied and in spelling the base words when derivatives alone had been studied.⁹ The *s* and *ed* forms gave the most consistent positive transfer. No difficulty was experienced with *tion*, except where the phonetic quality changes to add the suffix, as it does for "decide" and "decision." The most common instances of negative transfer were those which occurred in the spelling of words wherein the final *e* is dropped before adding *ing*, and in the spelling of certain base words like *excel* when the derivatives *excelled* and *excelling* had been studied.¹⁰

The facts that in English spelling, letters have many different sounds, and that the same sounds may be represented by many different letters, occasion many instances of negative transfer and make reliance upon transfer in the teaching of spelling unwise. For example, the sound of the letter *a* may be represented by *ā-a* as in paper, *a-e* as in ate; *ai* as in fail; *ai-e* as in praise; *ay* as in play; *ea* as in great; *ē-a* as in May; *ai* as in said; *ay* as in says; *ea* as in bread; *â-a* as in parent; *a-e* as in hare; *ai* as in air; *ay* as in prayer; *ea* as in wear; *ô-a* in warm, and so on.¹¹

Horn described a circus to groups of first-grade pupils who had

⁹ C. P. Archer, "Transfer of Training in Spelling," *University of Iowa Studies: Studies in Education*, 5 (1930), No. 5.

¹⁰ Cf. I. C. Sartorius, "Generalization in Spelling; A Study of Various Bases of Generalization in Teaching Spelling," Teachers College, Columbia University, *Contributions to Education*, No. 472, 1931; J. E. Mendenhall, *An Analysis of Spelling Errors; A Study of Factors Associated with Word Difficulty* (New York: Columbia University, 1930).

¹¹ E. Horn, "The Child's Early Experience with the Letter *a*," *Journal of Educational Psychology*, 20 (1929), 161-68.

had training in phonetics and asked them to write the word that stood for the thing described. Some of the spellings, together with their frequencies, are as follows: *srcus*, 20; *srks*, 10; *circus*, 6. He states that the sound *ēr* in *circus* can be spelled accurately or approximately in the following ways: as *ir* in *first*, *or* in *word*, *ur* in *fur*, *our* in *journey*, *ear* in *search*, *ere* in *were*, *ure* in *measure*, *err* in *err*, *oar* in *cupboard*, *oir* in *avoids*, *eur* in *chauffeur*, *olo* in *colonel*, *ro* in *iron*, *re* in *acre*, *yr* in *myrtle*, *yrrh* in *myrrh*, *irr* in *firry*, *urr* in *hurry*, *orr* in *worry*, and *ar* in *parental*.¹²

In 1915 Poffenberger stated three general conditions of transfer, as follows: (1) where there are no identical bonds between two processes the influence of one upon the other will be neither positive nor negative; (2) where there are identical bonds between two processes there will be positive transfer between the influencing and the influenced situation; (3) where one process necessitates the breaking of previously formed bonds, and the formation of new ones, there will be a negative transfer effect.¹³

Stimulus generalization. This phenomenon has been met before in the law of assimilation (Chapter X): when an association has been formed between A and B, other stimuli, A₁, A₂, etc., similar to A, will tend to evoke B. This is an instance of positive transfer. Of late this phenomenon has appropriately been designated as stimulus generalization. One of the first systematic investigations of the law of assimilation was made by Yum.¹⁴

In one experiment his subjects memorized lists of paired words

¹² *Idem*, "The Influence of Past Experiences upon Spelling," *Journal of Educational Research*, 19 (1929), 283-88.

¹³ A. T. Poffenberger, "The Influence of Improvement in One Simple Mental Process upon Other Related Processes," *Journal of Educational Psychology*, 6 (1915), 459-74. Cf. R. W. Bruce, "Conditions of Transfer of Training," *Journal of Experimental Psychology*, 16 (1933), 343-61; H. H. Wylie, "An Experimental Study of Transfer of Response in the White Rat," *Behavior Monographs*, 1919, 3 (1919), No. 5; W. C. Langer, "An Investigation of the Positive Transfer Effects in the Learning of a Sensori-motor Task," *Journal of Psychology*, 3 (1937), 371-79.

¹⁴ K. S. Yum, "An Experimental Test of the Law of Assimilation," *Journal of Experimental Psychology*, 14 (1931), 68-82.

TABLE XXXII

EFFECT OF CHANGES IN THE MEANING OF STIMULUS WORDS UPON
RECALL IN PAIRED-ASSOCIATES LEARNING

Condition	Mean	P.E. _m	Per Cent Recalled
Same Words	6.02	.22	50.2
First degree similarity	3.91	.22	32.6
Second degree similarity	1.35	.16	11.3

—*snake-weather, fight-ledger, house-breeze*. Under one condition a recall test was run (24 hours later) with the original first word of each pair being used in the capacity of stimulus. Under another condition words quite similar in meaning were substituted for the original stimulus words (first-degree similarity), as *serpent* for *snake*, *battle* for *fight*. Under another condition words less similar were substituted (second-degree similarity), as *turtle* for *snake*, *argument* for *fight*. There were 12 such pairs to a list. Table XXXII shows the results.

The generality of the phenomenon in question has been further demonstrated by Hovland and Gibson, as well as by others.¹⁵ Gibson's subjects were allowed trials on a list (referred to as the standard list) of geometric form-nonsense syllable pairs. Subsequently, various groups of the subjects were given practice, five trials each, in learning other lists—lists made up of form-syllable pairs as before, in which there occurred in all lists the same response syllables, these being different from response syllables of the standard list. For the first condition the stimulus forms were identical with those of the standard list. In other conditions the forms were so altered as to provide varying degrees of similarity to the forms of the standard list. It was found in one case that by empirical test these forms would elicit the originally

¹⁵ C. I. Hovland, "The Generalization of Conditioned Responses: I. The Sensory Generalization of Conditioned Responses with Varying Frequencies of Tone," *Journal of General Psychology*, 17 (1937), 125-48; E. J. Gibson, "Retroactive Inhibition as a Function of Degree of Generalization between Tasks," *Journal of Experimental Psychology*, 28 (1941), 93-115.

learned (standard) responses in 41.1 per cent of the cases, the original eliciting the appropriate responses in 84.5 per cent of the cases. Another list, resembling the standard list only slightly, elicited the standard response in only 9.7 per cent of the cases. The fact that these altered forms tended to elicit the same responses as the standard list is an instance of positive transfer; and the fact that the probability of their doing so is a function of the degree of similarity maintained between the altered and standard lists gives further evidence of the generality of the phenomenon of similarity.

The law of associative inhibition. In terms of the *Mueller-Schumann law of associative inhibition*, when an association has been formed between A and B, it becomes more difficult to form an association between A and any C (see Chapter X). The first condition in Gibson's investigation should prove to be the most difficult to learn because other responses had already been connected with the stimuli. This is a case of learning to make a new response to an old stimulus, in Bruce's formulation. The next most difficult should be the condition in which the stimulus forms have the greatest resemblance to the standard forms; and the least difficult should be the condition in which the forms bear no ostensible resemblance to the forms of the standard list. Bruce's results confirm this prediction in part. Thus there is a suggestion that the phenomenon of associative inhibition is an instance of negative transfer, and indeed may be an explanation of it.

The law of assimilation demands that when a stimulus-response relationship has been effected between A and B, $A_1, A_2 \dots$ similar to A, will tend to elicit B—an instance of positive transfer. When this occurs, the law of associative inhibition demands that it will be more difficult to associate A, $A_1, A_2 \dots$ with some other response, C, other things being equal. The latter is an instance of negative transfer.

Gibson's findings really justify an extension of the law of associative inhibition, which may be stated as follows: When a stimulus A, has been connected with a response B, it becomes

more difficult to connect A, and also other stimuli A_1 , A_2 ... similar to A, with another response, C, other things being equal.¹⁶

Transfer a Function of Nature of Training

Much of the discussion up to this point has dealt with the relationship between the influencing and the influenced tasks. Actually, relationships between tasks are important only because they secure relationships between mental processes. What can transfer from one task to another? The way a person analyzes or otherwise perceives a problem is a function of his past training. Knowledge transfers; so do mental sets, methods of procedure, attitudes, prejudices, habits of thought, and so on. It is probable that much of the time a person scarcely has any awareness at all of the phenomenon of transfer. We must conclude that such awareness is not necessary to the operation of transfer. Something of the import of transfer can be appreciated by reflecting upon what one would be required to teach an unspoiled native African tribesman before he could read and understand a page in an English textbook on high-school physics. Except for the operations of transfer, a person would have to proceed from the ground up more or less every time he faced a new situation.

While there is no way to obtain an education and no way for it to function except through the operation of transfer, it is recognized that some educational procedures are more effective than others. We have already seen that learning proceeds much faster when there is understanding, meaning, insight. This is because of the operations of transfer. Perhaps understanding and its correlatives are the most effective means available for bringing the effects of past experience to bear upon a situation. Can we teachers, turning the situation around, by instruction designed to foster understanding increase the chances that what is learned today will function tomorrow?

¹⁶ B. J. Underwood, "Proactive Inhibition as a Function of Time and Degree of Prior Learning," *Journal of Experimental Psychology*, 39 (1949), 24-34.

Happily a considerable body of research bears upon this topic. Uniformly it suggests a positive answer. In fact, nothing else would make any sense in terms of the logic of mental development. In a recent investigation Craig has shown that transfer effects can be materially increased by providing certain kinds of clues designed to lead to the discovery of certain principles.¹⁷

There is quite a large literature on cross-education, in which, for example, the effect of training in a skill with one hand carries over to performance with the other hand or with one of the feet. Uniformly large transfer effects have been observed. One experiment on cross-education, by Bray, is noted here.¹⁸ This study is of particular interest because of Bray's analysis made on the basis of introspective reports of his subjects. His subjects were engaged in thrusting at a target seen in a mirror, the view of the target itself being obstructed by a screen. As in other experiments in cross-education, the amount of response generalization was found to be significant. The task presented two difficulties in particular: (1) correction for the reversing effects of the mirror and (2) correction by the proper amount. A majority of subjects reported they found it best to correct for the reversing effect by kinesthesia.

The location of the first thrust was pretty much a matter of chance. The second "almost invariably carried the subject farther away from the target, because of the mirror-effect," and in the same direction. The third frequently carried him still farther away. Observing this circumstance, many of the subjects learned to make corrections by reversing the direction of the movement as kinesthetically experienced, disregarding visual cues except to get some appreciation of the amount of the error. Other subjects hit upon the happy method of trying to go farther in the same direction as that seen in the mirror. This of course tended to bring them back toward the target. This experiment, like others of its kind, suggests that as a result of practice with one member

¹⁷ R. C. Craig, *The Transfer Value of Guided Learning* (New York: Teachers College, Columbia University, 1953).

¹⁸ E. W. Bray, "Transfer of Learning," *Journal of Experimental Psychology*, 11 (1928), 443-67.

of the body the subject learns something which can be generalized to another member.

One of the most widely quoted of the early investigations is the Judd-Scholckow experiment in shooting at a target under water.¹⁹ Their subjects, fifth- and sixth-grade boys, practiced throwing small darts at a target placed 12 inches under water. One group was given a theoretical explanation of refraction; the other was given no general knowledge. The two groups progressed equally in all respects, the group that had the theoretical knowledge of refraction being in no wise the better. When a certain proficiency had been reached, the position of the target was changed from 12 inches under water to 4. The subjects without the theory were confused; the skill formerly acquired did not transfer to the new situation; the errors were large and persistent. Those with the theory adjusted quickly; their training transferred.

Other investigators have contrasted *practice* and *practice plus training*, somewhat as in Judd's experiments. Woodrow has compared practice in memorization with practice plus training in effective methods of memorization.²⁰ Cox followed the same procedure in learning acts of motor skill.²¹ Both obtained significant transfer effects from their training procedures compared to mere practice, as shown by the effect of transfer upon learning new tasks.

A final reference is to one of the investigations of Katona, in which he compares, with respect to transfer, a "senseless" and a "meaningful" method of teaching "match tasks."²² Under one condition subjects were shown how to reduce the five squares

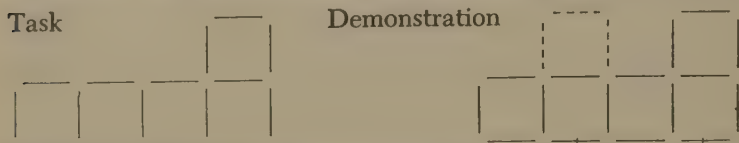
¹⁹ C. H. Judd, "The Relation of Special Training to General Intelligence," *Educational Review*, 36 (1908), 28-42; "Practice and Its Effects on the Perception of Illusions," *Psychological Review*, 9 (1902), 27-39; and Judd, "Practice without Knowledge of Results," *Psychological Monographs*, 7 (1905), 185-98.

²⁰ H. Woodrow, "The Effect of Type of Training upon Transference," *Journal of Educational Psychology*, 18 (1927), 159-72.

²¹ J. W. Cox, "Some Experiments on Formal Training in the Acquisition of Skill," *British Journal of Psychology*, 24 (1933), 67-68.

²² G. Katona, *Organizing and Memorizing* (New York: Columbia University Press, 1940), pp. 56-64.

below to four by changing the position of three, and only three, sides. The arrangement at the right was demonstrated as a teaching device. Six demonstrations were provided in order to assure



mastery. The subjects who by this instruction mastered the task were subsequently unable to solve the following similar task within the specified time limit. When *instruction* was given in



the first task by stating some adequate principle, transfer to the second task did occur. One such means was, in part, as follows: Since there are 16 lines from which are to be constructed 4 squares, "each square must have 4 independent side lines."

These experiments give point to the assertion that transfer is a function of the nature of the *mental activity* secured in the influencing task. The nature of the *task* is a determining factor because the nature of the activity induced is, among other things, a function of the task. They show that the nature of the activity induced can be influenced also by appropriate instruction or training.

Transfer and Brightness

As Ryans suggests, the application of previous learning to an immediate problem is our best evidence of intelligence.²³ Our

²³ D. G. Ryans, "An Experimental Study of the Transfer of Training with Special Attention to the Relation of Intelligence Test Performance," *Journal of Educational Psychology*, 27 (1936), 492-500.

classical definitions of intelligence imply this, a widely quoted one of which is *the ability to adapt to new situations*. A person can make a successful adaptation to a new situation only in terms of previous learning; otherwise his reactions would be infantile. Intelligent reactions cannot be made to *entirely new* situations; they must bear some similarity to situations previously encountered. Our definitions of intelligence and of transfer being what they are, there is a priori a necessary association between brightness and transfer.

In his well-known investigations on mental discipline in high-school studies Thorndike sought to assess the effect of a year's schooling in English, history, geometry, Latin, biology, bookkeeping, home economics, and various other high-school subjects upon performance on the IER Test of Selective and Rational Thinking and the IER Test of Generalization and Organization.²⁴ After making deductions for practice effects, he found that the best 1 per cent in initial ability made an average gain of 20.5 points; the lowest 1 per cent, an average gain of 1.5 points. "Those who have the most to begin with gain the most during the year. Whatever studies they take will seem to produce large gains in intellect."

In an earlier investigation Rugg obtained evidence of a positive relationship between transfer effects in descriptive geometry and scholarship in mathematics.²⁵ In an analysis of errors made in spelling relatively novel words, grades 4 to 6, Carroll found that the preponderance of the errors made by bright pupils involved a single letter and were phonetically logical, giving evidence of logical but negative transfer to the spelling of the word in question. The misspellings of the dull students did not show this logical character to the same degree.²⁶

²⁴ E. L. Thorndike, "Mental Discipline in High School Studies," *Journal of Educational Psychology*, 15 (1924), 1-22, 83-98.

²⁵ H. O. Rugg, "The Experimental Determination of Mental Discipline in School Studies," *Educational Psychology Monographs*, No. 17, 1916.

²⁶ H. A. Carroll, "Generalization of Bright and Dull Children; A Comparative Study with Special Reference to Spelling," *Journal of Educational Psychology*, 21 (1930), 489-99.

As was suggested at the outset, to demonstrate an association between transfer and brightness is to prove the obvious. The bright student gains better insight into what he learns, he is better able to analyze a situation and to perceive the relevance of past experience to it.

Transfer and Amount of Training

Positive transfer. Several investigations have yielded results that give evidence that both the amount and the sign of transfer are influenced by the amount of training. Bruce found that the amount of positive transfer increased directly with the number of practices.²⁷ Hovland, in his investigation of generalization of conditioned galvanic responses, found that the extent of the generalized responses increased as the number of reinforced stimulations increased, a finding that Razran²⁸ has confirmed. In a series of maze experiments Ho, using animals as subjects, obtained a positive relationship between the degree of integration of a habit and the magnitude of transfer effects.²⁹

Negative transfer. In the case of activities that yield negative transfer, several investigators have found a tendency for the sign to change to positive with continued practice of the inducing activity. Kline, who investigated a number of conditions, reported that those activities which yielded negative transfer did so only when a small amount of practice was levied.³⁰ Corroborative results have been obtained by Bruce and by Siipola and Israel.³¹

²⁷ "Conditions of Transfer of Training," *loc. cit.*, pp. 343-61.

²⁸ C. I. Hovland, "The Generalization of Conditioned Responses: IV. The Effects of Varying Amounts of Reinforcement upon the Degree of Generalization of Conditioned Responses," *Journal of Experimental Psychology*, 21 (1937), 261-76; G. H. S. Razran, "Studies in Configurational Conditioning: V. Generalization and Transposition," *Journal of Genetic Psychology*, 56 (1946), 3-11.

²⁹ Y. H. Ho, "Transfer and Degree of Integration," *Journal of Comparative Psychology*, 8 (1928), 87-99.

³⁰ L. W. Kline, "An Experimental Study of Associative Inhibition," *Journal of Experimental Psychology*, 4 (1921), 270-99.

³¹ Bruce, *op. cit.*; E. M. Siipola and H. E. Israel, "Habit-Interference as Dependent upon Stage of Training," *American Journal of Psychology*, 45 (1933), 205-27.

The operation of a related phenomenon is seen in the fact that continued practice of two antagonistic acts tends to reduce the interference to zero. This may be observed in many activities of daily life, as for example, in the case of persons who have acquired fluency in two or more languages. Stroop, for one, has subjected the phenomenon to experimental investigation.³²

Retention of Transfer Effects

It is well known that forgetting as measured by any of the usual methods—recall, relearning, recognition—begins almost immediately and proceeds rapidly at first, then continues, although at a decreasing rate. Much of the material learned in the laboratory, at least, is forgotten within a month or so. Do transfer effects dissipate at a similar rate? The limited information available suggests that they do not.

Bunch, whose subjects learned a ten-letter Peterson Rational Learning Problem, found that the transfer effects to another similar problem were largely independent of elapsed time up to 90 days. This despite the fact that retention of the first problem showed the usual loss with elapsed time.³³ Probably the permanency of transfer effects would be found to vary with the nature of the task; that is, would depend upon what is transferred. It might vary with the insightfulness of the material. We might expect to obtain different results for straight memory material, where set and method of procedure would be expected to account for a large part of the transfer effect. In another task it might be a discovered rule or principle that transfers. In any event, it may turn out that some kinds of transfer effects are retained much better than others.

³² J. R. Stroop, "Studies of Interference in Serial Verbal Reactions," *Journal of Experimental Psychology*, 18 (1935), 643-62.

³³ M. E. Bunch, "The Amount of Transfer in Rational Learning as a Function of Time," *Journal of Experimental Psychology*, 22 (1936), 325-37. Cf. M. E. Bunch, "A Comparison of Retention and Transfer of Training from Similar Material after Relatively Long Intervals of Time," *Journal of Comparative Psychology*, 32 (1941), 217-31.

Transfer in Education

Regarding the generality of the issue at hand, McGeoch and Irion state that "every new learning takes place in the context of all previously established habits."³⁴ More than that, every problem or every life situation is faced in the context of the total reaction potentials acquired through past experience. The ancient Greeks knew the meaning of marine fossils high up on the mountainside. They understood by these that the sea had once stood there. They also knew about fossils of mammoths and what they meant.³⁵ But the Dark Ages and medieval history and Christian cosmology were to follow. Two millenia later scientists were stoutly arguing the problem. Palissy knew what these things meant, but he died in the Bastille in 1590 for arguing the point before the learned dignitaries of the Sorbonne.³⁶ "The long history is a good example of how painful and groping is man's rise to knowledge and how faith, dogma, and authority can make us blind to the plain evidence of our senses."³⁷

What are we able to explain or predict in education from our knowledge of transfer of training? 1. We can predict the level at which it is profitable to undertake to learn, and explain why it is that the student must start at a given level and work upward in steps. 2. We can explain how meaningful material becomes meaningful. 3. We can explain why meaningful material is more readily learned and will have greater usefulness when learned. 4. We can explain how mental development takes place under the molding processes of education and predict that a given type of education will produce given results. 5. We can explain why an educated person's behavior differs from that of an undisciplined person. 6. Knowledge of how education produces its effect tells us a great deal about the kinds of educational experiences that should be sought after and the kinds of educational procedures

³⁴ McGeoch and Irion, *The Psychology of Human Learning*, p. 299.

³⁵ G. G. Simpson, *Life of the Past* (New Haven: Yale University Press, 1954).

³⁶ *Ibid.*, p. 8.

³⁷ *Ibid.*, p. 6.

we should strive to put into practice. Many of these things we know already from everyday experience. But a systematic knowledge of transfer of training should provide us with a rationale for our work.

Within the last decade or so there has developed considerable interest in general education at the college level. Attempts have been made to integrate large blocks of subject matter into a single eight-semester hour course, for example. Instead of separate courses in zoology, physiology, and psychology, we may find a single comprehensive course in the biology of man. The idea is that bringing together in a single course the contributions of the three disciplines will further the student's *general* understanding of man more than will the results of three separate and independent courses. The integrated program purports to teach together things that go together.³⁸

Certain modern educational theorists have given the impression that they have eschewed transfer of training as a guiding principle in education. This probably is not exactly what they mean. A glance at their positive recommendations shows that what they are actually striving for is some more dependable method of effectuating it. Surely no one could actually provide an educational program that would in miniature give an exact preview of all that is to come in life after school. This could not be done even with the guarantee that the pattern of adult life would never change. That which stands to the credit of these theorists is the fact that they have striven to effect the greatest possible similarity between school and afterlife. To the extent that they have succeeded, they have provided for one of the well-known conditions for the successful operation of transfer, not for something to take the place of transfer. It cannot be gainsaid that transfer is, has been, and will be the chief instrumentality in securing an education and in applying it when secured. The goal in curriculum making should be the securing of more transfer, not less.

³⁸ Cf. E. J. McGrath *et al.*, *Toward General Education* (New York: The Macmillan Company, 1948).

A second trend in modern education, the increasing emphasis upon meaning, understanding, useful generalization, and so on, has its chief justification, insofar as functional value goes, in the fact that it furthers transfer. Generalizations about pertinent aspects of man and the universe are useful and applicable because of their transfer value. A method of instruction that utilizes facts as means to an end—a means of attaining generalizations—is to be defended on the same ground.

There is every justification for making school lifelike. Lifelikeness ensures transfer not only because of the similarity between school and life thus secured, but also because the same lifelikeness makes for better understanding of instruction.

This is illustrated in the pupil-participation movement. Many educators have seen in pupil participation in school management excellent opportunities for training in citizenship. In 1909 Dewey averred that "the school cannot be a preparation for social life excepting that as it reproduces, within itself, typical conditions of social life."³⁹

To the same purpose, in 1931 Fretwell wrote:

These pupils can be learning in the voluntary associations with their fellows how to cooperate for a common good, how to lead or select a leader wisely and to follow him, how to assume responsibility and to make good, and, where the teachers advise enough but not too much, there is a real opportunity for the development of many of the qualities a good citizen must have.⁴⁰

Transfer may be made more certain by inculcating *general* democratic ideals and principles of self-government, and by effecting as much similarity as possible between the social organization in school and that in the community.

In many ways arithmetic presents one of the most interesting subjects from the point of view of the topic at hand. Transfer is the essence of generalization. Any generalized skill like arith-

³⁹ J. Dewey, *Moral Principles in Education* (Boston: Houghton Mifflin Co., 1909), p. 14.

⁴⁰ E. K. Fretwell, *Extra-curricular Activities in Secondary Schools* (Boston: Houghton Mifflin Co., 1931), pp. 111-12.

metic, or reading, writing, and speaking, transfers, by definition. A child who can count marbles can count pennies; one who can add, subtract, or divide sheep can treat bushels of corn or acres of land in the same way. Generalized skill like the fundamental arithmetic operations is independent of the particular content utilized in acquiring it, as is to be seen in the most elementary process of all, counting. We may give the small child practice in counting blocks in order to teach him to count, not just to count blocks. Insofar as the utility of arithmetic is concerned, purely hypothetical problems have as much transfer value as those dealing with lifelike problems of the community. Of course, the *teaching* of arithmetic may be made to have greater social utility by enriching the content. If by substituting "Fire Department" for A and "Community Chest" for B, we can effect a bit of correlation between arithmetic and civics, so much the better for civics, and for the learning of arithmetic. But inasmuch as the operations of arithmetic are general in character, they transfer almost completely. The rules for determining the area of a sheep pasture in Kent are the same as those for determining the area of the playground in Centerville. The rule for dividing fractions—*invert the divisor and multiply*—is perfectly general. We do not ask, "What fraction?" If a pupil is asked to find 6 per cent of a number, it does not matter whether the number designates a quantity of bacteria in milk or the size of the local police force.

Why, then, should we be concerned about making arithmetic lifelike? For one thing, it is more interesting that way. The learning of arithmetic can be made to serve a natural end, as pupils engage in working arithmetic problems as a social group and in finding answers that are socially useful. Thus working problems ceases to be a chore. Pupils are frequently encouraged to make many kinds of physical measurement of things about them. Young pupils may be found computing the number of square feet in their home lot, measuring the distance from home to school, determining the height of the ceiling in the schoolroom, or the diameter of trees on the front lawn, and all kinds of similar measures. It is not a foregone conclusion that the child normally

has any greater interest in the physical dimensions of the familiar objects in his environment than in less familiar objects. We run the risk of getting the cart before the horse. The object of dimensional measurement is to tell how big something is. The probability is that before he begins to use mathematics the pupil already knows, for his own purposes, the size of most objects in his environment. Actually, we contrive to have the pupil apply mathematical measurement to familiar objects not so much that he may learn about the objects as that he may learn about measurement. We do not require him to compute the diameter of a tree in his front yard to teach him how big that particular tree is, but rather to teach him how big a tree having that diameter is. We do not have him determine the length of the schoolroom because he needs to know how long it is, but to teach him how much that length is, and, of course, to teach him how to measure. There is good reason to provide instruction in mathematics in connection with problems of daily life, because then mathematics will be more meaningful.

Transfer and Mental Organization

There remains to be noted another aspect of the greatest consequence in the furtherance of mental development through transfer; namely, the organization of experiences. No number of experiences could ever make an integrated individual—a personality having various predispositions and reaction patterns—except as experiences become organized into functional systems. We all know what it means to have ideals, principles, a philosophy of life, frames of reference, attitudes, behavioral dispositions, standards of social conduct, prejudices, beliefs, and so on. In a sense these are organizations of past experiences into certain personality patterns. We are also aware of the importance of these patterns in daily conduct. As often as any issue of consequence to us arises, we meet it with one or more parts of our personal armor. The effects of past experience transfer to the situation. They determine what our initial attitude shall be; what

method of attack shall be followed; how we shall weigh the evidence; and they influence our conduct in a host of other ways. Thus while in education and psychology transfer has usually been treated as a condition of learning, it is no less a condition in the adaptive behavior of the individual.

All this leads to consideration of what the factors are that direct the organization of experiences into functional systems, as it were. Without attempting an exhaustive answer, and without considering the possibility of there being other factors, this text will suggest that a dominant factor is the motives of the individual. The abiding motives—purposes, interests—serve to integrate experiences into functional patterns. Such integration becomes an all-important item in mental development and at the same time provides a medium through which the effects of past experience are applied to a situation.

ADDITIONAL REFERENCES

- Brownell, W. A., "The Effects of Practicing a Complex Arithmetical Skill upon Proficiency in Its Constituent Skills," *Journal of Educational Psychology*, 44 (1953), 65-81
- Coladarci, A. P., ed., *Educational Psychology: A Book of Readings* (New York: The Dryden Press, 1955), Chapter VI
- Deese, J. E., *The Psychology of Learning* (New York: McGraw-Hill Book Co., 1952)
- Smith, D. E. P., "Applicational Transfer and Inhibition," *Journal of Educational Psychology*, 45 (1954), 169-74

MENTAL HYGIENE AND THE SCHOOL CHILD

Approaches to Adjustment

THE WAYS OF MANKIND are learned. The ways of each individual entity that makes up mankind are learned. What we learn is behavior. Of course we learn feelings and attitudes, but these are not outside behavior. We behave "somewhere" when we feel, or have attitudes. Since we can designate our feelings and attitudes by words, we can say we have feelings and attitudes about this or that without actually acting them out on the spot. Personality is defined somewhat in terms of characteristic ways of behaving, usually in certain areas that are of particular consequence to the individual's social and personal adjustment.

Personality as learned behavior. Personality traits are learned in the same way that other forms of behavior are learned—the constituent acts are performed and reinforced, and they are performed in response to the drives and the cues that are present. A certain little child of two adopted the recourse of going to bed when visitors whom he did not like came to call, or when he fell into unpleasant difficulties with his parents, over a food problem at the table, for example. This had in it the elements of rewarding behavior (through escape) and, had it persisted, could have become the germ for the growth of withdrawing tendencies. Another child confronted with stern and exacting parents may

find that when he does not yield to their wishes he is punished and that when he does yield, he is rewarded by a show of affection. Moreover, the avoidance of anticipated punishment may have a reinforcing effect. Conformity means happy, at least undisturbing, family relationships; flouting parental wishes means conflict in family relationships and possibly actual physical violence. Of course a certain amount of this is normal, and perhaps desirable. It is probably inevitable. But when it goes to extremes, depending upon the disposition of the child, we have the foundation for the development of a child who yields, gives in, rather than standing up for what he regards as his right. In all this the child may become positively identified with his parents, so that actually he may come to approve of this kind of attitude. Clearly, this makes the situation worse. It may become deplorable if there develops in the child a generalized anxiety about losing friends or the affection of the adults who figure in his life. This may lead to an inhibition of self-assertive behavior in general.

On the other hand, self-assertive tendencies can be entirely too strong. It is easy to understand how these traits are learned. If by storming around, persisting, and bullying the child gains his ends by getting others to yield, we have the reinforcing effects requisite for the learning of such traits. This too is capable of generalization, so that self-assertive tendencies are called out in too many situations.

The insecure child is rewarded when he yields by the reduction of anxiety about losing affection and status. The child who feels inadequate may gain the attention he needs by a show of his talents, by bragging, by always being the first to put his hand up in class. If this behavior satisfies the motivating conditions, it is reinforced and learned. To the extent that it generalizes, we have a person with personality characteristics of this kind. Some of the practical school remedies for problems of this kind will be considered presently.

Dissocial behavior, indeed undesirable behavior in general, is learned. It is learned because circumstances have evoked this

kind of behavior and because circumstances and motivation (needs, drives, and so on) have made it rewarding.

Some years ago Park and Burgess suggested four principal classes of tendencies to behave in social situations: to withdraw, to approach, to dominate, and to yield. We need not for present purposes concern ourselves with the merit of this classification. It is sufficient to recognize that individuals do display certain behavior tendencies with sufficient regularity to permit us to look upon these tendencies as being characteristic of them. The personality traits of an individual are in part, perhaps in large part, those traits which typify his manner of maintaining adjustment.¹

Recent years have witnessed a resurgence of interest in the learning of personality. Some authorities, for example Whiting and Child, Dollard and Miller, Mowrer and his collaborators, have approached the problem from the standpoint of learning theory. Whiting and Child have made a frank attempt to fit social learning and anthropological data into a framework of reinforcement learning theory. Honigman and Lehner and Kube have emphasized the impact of social and cultural forces upon the development of personality. There is a temptation at this point to enter into a discussion of these issues. But since the author's purpose in this section of the chapter is merely to provide a setting for the discussion of mental hygiene in education, it seems best to forgo a general discussion of the development of personality.²

Inferiority and compensation. The principle of compensation appears to be an instance of what Cannon has called homeostasis (from the Greek *homeo*, alike, and *stasis*, standing still), a head

¹ R. E. Park and E. W. Burgess, *Introduction to the Science of Sociology* (Chicago: University of Chicago Press, 1921).

² J. W. M. Whiting and I. L. Child, *Child Training and Personality* (New Haven: Yale University Press, 1953); O. H. Mowrer and others, *Psychotherapy, Theory and Research* (New York: Ronald Press Co., 1953); J. Dollard and N. E. Miller, *Personality and Psychotherapy* (New York: McGraw-Hill Book Co., 1950); C. Thompson, *Psychoanalysis* (New York: Hermitage House, 1950); G. F. J. Lehner and E. A. Kube, *The Dynamics of Personal Adjustment* (New York: Prentice-Hall, 1955); J. J. Honigman, *Culture and Personality* (New York: Harper and Brothers, 1954).

under which are listed a number of conditions that living organisms defend against change. A warm-blooded animal, for example, by various mechanisms maintains its bodily temperature within very narrow limits. There are other mechanisms that operate against loss of blood, depletion of the water content of the body, and so on. Commenting upon the principle of homeostasis, Guthrie says: "Living creatures differ from non-living creatures in that they react to change in circumstances by so changing themselves as to preserve certain of their essential characteristics constant."³ These essential characteristics may be, in our culture, extended to include professional status, moral character, beliefs, and even the basic premises of a philosophy of life.

In the normal run of events feelings of *emotional insecurity* probably cannot be readily compensated—at least not in the usual sense of compensation by achievement, although feelings of security in the affection of one's family or intimate friends would seem likely to stand as a bulwark against many a threat to security from other sources. Moreover, feelings of emotional insecurity can be compensated by fantasy and by identification with a love object. We may also assume that a strong sense of group membership at school may compensate for a lack of a feeling of membership at home. On the other hand, feelings of inferiority or inadequacy can be ameliorated by compensatory achievement. Indeed, it would seem to be because of this fact that a human being is ever able to escape such feelings in the first place, owing to the countless spheres of life in which he compares so unfavorably with others. A good salesman may feel no concern about his fumbling the tools of a mechanic; and a scholar may experience no chagrin over his incompetence at both men's work. But he does bestir himself in behalf of his status as a scholar—not in every field, but in the field in which he has staked his claim.

An individual is normally unable to satisfy many of his wishes,

³ E. R. Guthrie, *The Psychology of Human Conflict* (New York: Harper and Brothers, 1938), p. 4.

or is able to do so only in a limited way. Perhaps in a majority of cases such failure occasions no particular distress. In many instances failure results from the incompatibility of a person's wishes. He voluntarily forgoes the gratification of one wish in order to make another real. Such failure is not a threat to status. There are instances in which the inability to satisfy a wish is a threat to one's status and to the preservation of self. Such failure is of the greatest consequence psychologically.

Bagby has suggested that inferiority complexes are fear reactions to social disapproval or self-criticism. He recognizes two stages in the development of the complex, the primary and the final. In the primary stage fear reactions become attached to "social situations involving attitudes of disapproval." There arises a sense of personal inferiority, he suggests further, which has its origin in the criticism to which the individual is subjected. This observation is continuous with the point made in Chapter IV that self-appreciation is based upon a person's evaluation of the reactions of others toward him, and with socialized anxiety, mentioned in Chapter I. The final stage is distinguished from the primary stage chiefly by the nature of the defense reactions and by the number of stimuli adequate to calling them out. In the former the defense reactions are "numerous, simple, and transitory"; in the latter, "few, elaborate, and persistent." The final stage is also marked by an increase in the range of adequate stimuli. Initially, the adequate stimulus may have been overt criticism or ridicule; in the advanced stage many things, even a lack of commendation, may call out defense reactions.⁴

Moreover, inferiority feelings and the concomitant defense reactions tend somewhat to become generalized, with the result that persons tend to over-react to adverse criticism in general. Such persons are extremely sensitive, tend to be poor losers, over-react to commendation, and, as Bagby suggests, develop facility in so turning conversation that praise is called for, or they may even succeed in interpreting the most adverse criticism as praise.

⁴ E. Bagby, *The Psychology of Personality* (New York: Henry Holt and Co., 1928), Chap. VIII.

They tend to be suspicious of the actions, gestures, and motives of others. On the whole, they do not relish competitive activities.

In the more advanced cases it may be helpful to bring the individual to a realization that his symptoms have their origin in an inferiority complex. Such realization will not ordinarily resolve the complex; but if the cause of the symptoms is fully understood, if the person realizes that his feelings and defense reactions are typical of those having inferiority complexes, his condition is made more tolerable, and he may be able to guard himself more successfully against social embarrassment occasioned by the symptoms.

Adler on inferiority and compensation. In 1912 Adler published a treatise on organ inferiority, translated in 1917, in which he described numerous instances of *organ* inferiority and compensation.⁵ This work began with accounts of deficiencies in the renal apparatus and, as his theory was elaborated, later extended to various organs of the body.

Although in the 1912 monograph Adler makes frequent reference to psychic compensation, it is not clear, at least to the writer, that he was thinking of compensation in terms other than the role of the central nervous system in organ compensation. In his book on *individual psychology*, published in 1922, and translated into English in 1925, compensation in the behavioral sense is brought to the fore.⁶ This principle of homeostasis—this “striving” to maintain one’s essential characteristics constant—becomes, for Adler, the dynamics of personality.

Every psychic phenomenon is envisaged as a preparation for some goal. Adler’s “*most general presupposition*” is that “the psyche has as its objective the *goal of superiority*.”⁷ He maintains that this presupposition holds equally well for the mentally healthy and the diseased. That which distinguishes the diseased

⁵ A. Adler, *Study of Organ Inferiority and Its Psychological Compensation*, Nervous and Mental Disease Monograph Series, No. 24 (New York: Nervous and Mental Disease Publishing Co., 1917).

⁶ A. Adler, *The Practice and Theory of Individual Psychology* (New York: Harcourt, Brace and Co., 1925).

⁷ *Ibid.*, pp. 4 and 7.

from the healthy individual is not a difference with respect to goals but the fact that "the former's life-plan" is filled with "stronger safeguarding tendencies."

He sees in this goal of superiority the fountainhead of human striving. If everyone is actuated by this goal, then, says Adler, we ought to encounter efforts to minimize and undervalue others. "Traits of character such as intolerance, dogmatism, envy, pleasure at the misfortune of others, conceit, boastfulness, mistrust, avarice—in short all those attitudes that are the substitutes for a struggle, force their way through to a far greater extent, in fact, than self-preservation demands."⁸

Conflict. Discrepancies between an individual's goals and his attainment leads to conflict. Incompatibility of goals, as when in order to realize one goal a person must forswear another, may also lead to conflict, although the seriousness of conflict probably varies with the amount of ego involvement. The conflict itself may be characterized as an unpleasant affective reaction. Every instance of failure of goal attainment and every instance of incompatibility of goals presumably leads to some unpleasantness. Many such instances lead merely to transitory conditions, which are easily resolved and produce no important and lasting effects. On the other hand, those resulting from conditions which constitute a threat to security and adequacy, and especially those which involve a sense of blame and lay the individual open to criticism, are likely to be more lasting and to lead to more serious consequences.

Mental conflict is one of the consequences of mental development. Writers in the field of mental hygiene have pointed out that conflicts may arise in the life of a child as soon as his mental development permits of self-evaluation—as soon as he becomes conscious of the valuation others attach to his behavior. However, inasmuch as the young child normally leads a highly protected life in the sense that comparatively little of his behavior comes under the critical reflection of society, he is subject to comparatively few conflicts.

⁸ *Ibid.*, pp. 8 and 9. Quoted by courtesy of the publishers.

When the child enters school, and as he progresses up through the elementary grades, the field of his competitive behavior widens, the number and the complexity of his goals increase, and much of his behavior comes under critical observation and social evaluation; and even his goals and the more private aspects of his life, such as his interests and motives, come within the pale of social criticism. As he approaches maturity he comes into possession of certain biological impulses that are met by a stubborn array of social taboos; and a sense of guilt occasioned by violation of the sex mores may sometimes be quite disturbing.

Conceivably, a lack of social success with members of the opposite sex, and inability to command the attention of desired companions, in a manner that has little to do directly with the satisfaction of the biological impulses, are a greater source of conflict than the scant emphasis they have received would indicate. The inability to satisfy these biological impulses does not normally lead to loss of status. The very presence of social taboo protects his ego. On the other hand, it is expected that upon the attainment of a certain age and social position a person will participate in social activity involving the two sexes. Lack of success here cannot well be hidden from social inspection and the individual who fails in his social ambitions stands to experience unfavorable comparison with others. In such instances the resulting conflicts may be reinforced as it were by emotional reactions of another sort as the individual may attribute his failure to deficiencies in personal appearance or social upbringing, to the social and economic position of the family, or to racial, religious, and nationality discrimination.

By the time a pupil reaches high-school age he gains a certain amount of freedom from the restraints of the primary group and begins to make adjustments to secondary groups. Many pupils at this time find that the cherished customs and standards of the primary group constitute barriers to their full acceptance in the new groups. The desire to be identified with these new groups and an unwillingness to give up the social standards of the primary groups may lead to serious conflict.

Adjustive behavior. In the following paragraphs a brief account is given of the commonly recognized modes of adjustment; or, as may be said, some instances of homeostasis as applied to personality. A great variety of names is encountered. Shaffer reports the finding of sixty-five names of mechanisms listed in only seven books on mental hygiene. Only two, *daydreaming* and *repression*, were listed in all seven books. Two more, *rationalization* and *compensation*, were cited in six of the seven books; and four, *anxiety*, *dissociation*, *hysteria*, and *phobias*, in five books. Of the others, five are mentioned in four books; six, in three; twelve, in two; and thirty-four, in one.⁹ Shaffer himself groups the mechanisms under five heads: (1) adjustment by *defense*, typified by marked aggression, usually involving undesirable or antisocial behavior; (2) adjustment by *withdrawing*, characterized by unwillingness to participate in social behavior; (3) adjustments involving *fear* and *repression*; (4) adjustment by *ailment*; and (5) *persistent nonadjustive reactions*. A characteristic which all adjustment mechanisms have in common is their *protective* or *safeguarding* function.

Defense reactions. The reactions usually listed in this group are logically related in the sense that they appear to stem from a common source, a sense of inferiority. They differ from withdrawal reactions in that they are more aggressive. Once a feeling of inferiority has developed to the "final stage," compensatory behavior may exhibit an intensity and a degree of aggressiveness much beyond that normally required for the preservation of the sentiments of self-regard. In such a state individuals are reluctant to accept responsibility for defeat. They are inclined to shift the blame, as in *projection*, or to minimize the failure or justify it protectively, as in *rationalization*. They may also *identify* themselves with a successful person or group or a winning cause, as a technique of defense. Some resort to *egocentric behavior* as an attention-getting device, as if, perhaps, to assure themselves of

⁹ L. F. Shaffer, *The Psychology of Adjustment* (Boston: Houghton Mifflin Co., 1936) p. 144; F. F. Real and W. W. Wattenberg, *Mental Hygiene in Teaching* (New York: Harcourt, Brace and Co., 1951).

response from others. Many of the behavior problems in school that require disciplinary measures are traceable to an inferiority feeling. Such forms of antisocial behavior are regarded as defense mechanisms. They may assure a certain amount of social approval from some groups. However, it seems easy to carry this interpretation too far. Some behavior problems, or at least conduct problems that are quite disturbing to the teacher, may simply stem from group mores.

Withdrawal. There is much overlapping in function between withdrawal and defense reactions. *Timidity, diffidence, fantasy, negativism, and regression* are protective or defensive quite as much as the defense reactions. They are more subtle and are less aggressive. Of this group only fantasy is compensatory in an important degree. They are all safeguards. Sherman makes the point that the nature of the child's early home life may be a disposing factor with respect to the kind of reaction adopted. If parents are hypercritical and resort frequently to punitive measures, the child is likely to develop some form of withdrawal response when faced with difficulty. If, on the other hand, the parents are overindulgent and encourage attention-getting mechanisms, the child will have a tendency to resort to egocentric behavior when frustrated.¹⁰ Thus when pupils are faced with a situation that threatens their security, they may be expected to make use of reaction patterns that have proved successful in the past.

Withdrawal reactions may have an origin common with defense reactions; to wit, loss of security and feelings of inferiority. They may also have a somewhat different, though related, origin. In a sense, they may be said to spring from a broader base; namely a generalized fear reaction. These fear reactions may have their beginning in harsh, cruel treatment at the hand of a parent, or in unfortunate experiences of various kinds. The origin of the fear reactions may be in actual or anticipated bodily violence or in embarrassment in social situations. A poor showing

¹⁰ M. Sherman, *Mental Hygiene and Education* (New York: Longmans, Green and Co., 1934), Chap. IV.

on the playground, owing to clumsiness or physical defect, may lead to ridicule and consequent embarrassment. Social rebuffs, unattractiveness in personal appearance, mental handicaps, hard treatment by stern and unsympathetic teachers, lack of social grace, and similar factors may contribute to the upbuilding of generalized fear reactions.

The diffident pupil, or one who has met with repeated rebuffs, may seek solace in books, hobbies, and fantasy. No one of these pursuits is in itself undesirable. In fact there is a measure of good in each. They are detrimental only when carried to the extreme. But because of the purpose they serve and the satisfying nature of the responses, there is a tendency to indulge in them excessively. In such instances the pupil tends to lose social rapport and contact with reality.

Daydreaming and the reading of romantic literature may be a healthy stimulus, and actually elevating. But because of their romantic and satisfying qualities they may get out of hand. The pupil may find the humdrum of reality drab and uninteresting in comparison. In fantasy he can arrange the stage of life and its actors as he wishes. Thus he may come to prefer the imaginary exploits of his daydreams and the romantic world of the novelist to his feebler exploits in the world of reality.

The various patterns of daydreams suggest strongly that they frequently serve as compensatory mechanisms. Green's classification of daydreams according to type suggests this: *display*, in which the daydreamer gains applause for some act of daring; *savings*, in which he gains the gratitude of the person "saved" and acclaim of others; *grandeur*, in which he represents himself as a person of great consequence; and *homage*, in which a personal sacrifice of great cost is made in behalf of another whose "love or sympathy is sought."¹¹ Much autistic thinking of this character is in the realm of the improbable. There appears to be some advantage in this from the standpoint of the mechanism involved, in that the daydreamer is protected from rude awaken-

¹¹ Shaffer, *op. cit.*, p. 191.

ings that would surely follow if the test of reality could be applied.

In view of the highly satisfying aspects of daydreams it seems likely also that many children and adults indulge in them merely as an interesting pastime. Children who are lacking in companionship, books, and other forms of diversion are prone to fantasy. Pupils who have difficulty in reading or who are typically given reading assignments that are unsuited to their abilities and who are unchallenged much of the time by their lessons may also spend an excessive amount of time in daydreaming.

Fear and repression. It was made clear above that fear is prominently associated with the origin of defense and withdrawal reactions. Two forms of persistent *nonadjustive* fear reactions are recognized: phobias and worries. Phobias are strong, uncontrollable fear reactions to a restricted class of stimuli. They have their origin in some traumatic incident or emotional crisis. One characteristic of phobias is that there is some transference of the stimulus properties of the inciting incident to other stimuli of the same class.

Associated with the etiology of phobias is a sense of guilt. The individual is bent on some forbidden mission when the crisis occurs. Putatively, it is this condition that leads to the next characteristic—repression or forgetfulness of the incident, or at least a failure to accept the inciting incident as an explanation of the symptom.

Worry, as described by Bagby, is a “persistent mood of fear” aroused by a situation for which the individual has no reduction mechanism. If the inciting conditions remain in the consciousness of the individual—that is, if he remains conscious of the conditions as sufficient causes—he stands to make some adjustment after a longer or shorter time. If, however, repression occurs, if he represses his thoughts on the subject, so that the symptoms are no longer connected in thought with the provocation, and the provocation remains, the mood of fear will continue. This circumstance is known as morbid worry.

Ailments, adjustive and nonadjustive. The ailments here referred to are of the functional variety, belonging to the group commonly included under the caption *hysteria*. We are indebted to Janet for a classical treatment of this group of ailments.¹² Perhaps shellshock and the *amnesic fugue* constitute the most dramatic firsthand examples. The former includes such well-known symptoms as functional paralysis, functional anesthesia, tics, and compulsions.¹³ The significant element in these cases from the standpoint of adjustive behavior is that there is an advantage in them for the patient. The soldier is actuated by two powerful and contradictory impulses: a sense of patriotism and devotion to his homeland and fireside on the one hand and fear and the desire to escape the privation and terrors of modern warfare on the other. An ailment like paralysis of a limb or loss of sight would incapacitate him for service at the front and would at the same time preserve his honor and sense of patriotism. McDougall suggests that it is unlikely that a person of entirely sound constitution is subject to this mode of adjustment. But he thinks persons of originally sound constitution may, when subjected to prolonged privation and exposure, succumb to shellshock. The amnesic fugue, as occasionally described in the daily press, is likewise regarded as a protective mechanism—an escape from a burdensome reality.

It is not to be supposed that these or other ailments of this class are of frequent occurrence, or that the teacher is expected to be able to diagnose and treat them. However, they do show the extent to which individuals may be driven, in extreme circumstances, in order to resolve conflict and attain a measure of adjustment. The dynamic principles of behavior as seen in these exaggerated forms are the same as those reactions described earlier. Adler's pronouncement that the abnormal differ from the normal only in the intensity of their defense reactions is apropos.

¹² P. Janet, *Major Symptoms of Hysteria* (New York: The Macmillan Company, 1913).

¹³ W. McDougall gives an excellent account of these disorders in Chaps. XII and XIII of his *Outline of Abnormal Psychology* (New York: Charles Scribner's Sons, 1926).

The recognized importance of adjustment and maladjustment is to be seen in the large number of disciplines devoted wholly or in part to work in this field. The following is a partial list: psychoanalysis, psychiatry, psychosomatic medicine, clinical psychology, school psychology, counseling, mental hygiene, psychotherapy, social work, cultural anthropology.

Basic Needs of Children

Aggressive behavior. There may be some question about the propriety of designating aggression as a need. At least it seems not to be parallel with the need for security, success, and social acceptance, to be discussed presently. Once self, or consciousness of self, arises, security, success, and social acceptance become basic to self-realization and the development of feelings of self-worth. Were there never any frustration of these aspirations there probably would be little urge toward aggressive behavior. The need to express aggression follows from frustration. Since frustration is a common factor of life, the expression of aggressive behavior takes on some of the characteristics of a need; it is actuated by strong impulses and it has some therapeutic value. This is particularly true of certain maladjusted persons.

Thus accumulating psychological evidence suggests strongly that a basic human characteristic is the need to express aggression. We may subscribe to this principle and at the same time admit that some people indulge in the satisfaction of this need to a greater extent than is required for purposes of mental hygiene. Expression of aggression can cover a wide range of behavior. There are as many kinds of aggression as there are ways of showing hostility. It can be directed toward a person by word, deed, or gesture, toward his reputation or his possessions. In general the need grows out of the frustrations of life. These may be associated with particular persons or with the circumstances of life in general. It should also be observed that aggression may be directed toward people or circumstances quite removed from those responsible for the frustration. Dollard *et al.*

define frustration as "that condition which exists when a goal-response suffers interference."¹⁴ The postulate developed by Dollard and his associates is that aggression presupposes frustration. They have proposed the following three conditions in terms of which the strength of frustration and its reciprocal, the strength of instigated aggression, varies: "(1) the strength of instigation to the frustrated response, (2) the degree of interference with the frustrated response, and (3) the number of frustrated response-sequences."¹⁵ There is the implication in the third condition that frustrations summate. In early life the individual learns that it is expedient to inhibit many aroused tendencies. The tendency to do this may increase enormously as the individual grows older and increases in social competence. He may also develop many subtle techniques by which aggression can be expressed with a fair degree of impunity. In the work just cited it is suggested that the strength of inhibition varies with the strength of anticipated punishment. It is also noted that inhibition of acts of aggression leads to additional frustration. The frustration induced by inhibition becomes an additional source of aggressive behavior, the two frustrations tending to summate.¹⁶

In connection with his child-guidance work Slavson and his colleagues assigned certain children to groups in his program of group therapy. The children were selected for participation more or less on the following bases: (1) the child must be under thirteen years of age, (2) must have had inadequate social contacts, (3) must display neurotic traits, (4) must have been unable to get along with children and have need to express aggression. The environment created was a permissive one. The purpose of the permissive environment was: (1) to convince the child that the therapist and the therapy group did not intend to continue the persecuting and rejecting treatment to which the child had been accustomed; (2) to lead him to feel that he is unconditionally

¹⁴ J. Dollard *et al.*, *Frustration and Aggression* (New Haven: Yale University Press, 1939), p. 11.

¹⁵ *Ibid.*, p. 28.

¹⁶ Cf. R. R. Sears, "Non-Aggressive Reactions to Frustration," *Psychological Review*, 48 (1941), 343-46.

accepted, with all his faults and hostilities; (3) to relieve him of disapproval, censorship, and punishment, and, as a consequence, of his own guilt feelings; and (4) to give him a chance to act out his infantile impulses and remove his anxieties. Whereas the early superego (restraining impulses, moralities, conscience, and so on) is derived from fear—fear of punishment, rejection or abandonment—a new superego is to be built up derived from love and positive identification. Elsewhere Slavson makes the point that children who are repeatedly reprovved, censured, and punished can scarcely escape guilt feelings.

“What the psychotherapists need to do is to remove the patient’s resistance to the world and to the people in it who influence him in a social way.”¹⁷ This is a major purpose in the therapist’s permissiveness and acceptance.

This aspect of group therapy, permissiveness and unconditional acceptance, resembles some of the features of *play therapy*. In play therapy, typically the child is alone with the therapist. Even if other children are present, it is doll play or work with materials that is the focus of activity.¹⁸ In interview therapy, especially the nondirective sort, the client is allowed to express himself freely on all subjects. He is given opportunity to “talk out” his hostilities and difficulties, whereas in group therapy and play therapy he can act them out.

Security. Every child needs the security of unconditional love, to use Slavson’s terminology, from his parents or the other adults who figure in his life in an important way. When this is lacking in the life of a child, a substitute is needed. This is one of the roles of the group therapist. It may also be one of the roles of the psychiatrist or the case worker. No doubt thousands of teachers play this role also, either consciously or unconsciously. However, the point has been made that teachers do not make

¹⁷ S. R. Slavson, *Introduction to Group Therapy* (New York: Commonwealth Fund, 1943).

¹⁸ V. M. Axline, *Play Therapy* (Boston: Houghton-Mifflin Co., 1947); C. E. Moustakas, *Children in Play Therapy* (New York: McGraw-Hill Book Co., 1953).

good group therapists. Certainly the teacher trained to traditional attitudes and practices aimed at good discipline (in the traditional sense), and hedged about by all kinds of official restrictions, is not in a position to foster an atmosphere of unconditional acceptance. Because of the teacher's own ego involvement it may be difficult for him or her to assume an attitude of objectivity that is more or less essential to unconditional acceptance. Instead there is likely to be acceptance with reservation. A director of an association for crippled children writes: "We are interested in securing [workers] . . . who have a nonpunitive approach in working with children, and an understanding of their needs as individuals."

The methods employed in group therapy for convincing the child of unconditional love and acceptance should be quite instructive from the standpoint of teaching: (1) The child is supplied with materials for work, which he can use as he pleases, constructively or destructively, without evoking suggestions, or corrective or scolding remarks. (2) He is free to come and go as he pleases. (3) His needs for crafts material are amply met. (4) His personality is at all times respected. (5) The therapist employs no restraint in the early stages. (6) The child is allowed to take anything home he likes, unless restrained by other group members. (7) The therapist praises freely all constructive effort of the child. (8) The child's desires for food, trips, and movies are met by the therapist. It should be noted that destructive behavior is not *approved*, but it is *accepted*.

Perhaps it will occur to the reader that these are rather pale expressions of love and affection. The objective seems to be to remove the negative and obstructing factors in adult-child relationships. The aim is to create conditions under which each child can draw such strength from the therapist and the group as he needs.

Throughout, the therapist maintains a neutral, objective attitude. There is no showing of affection in the usual sense. There is no favoritism. In group therapy the therapist is never to be alone with a child. His role is that of a strong, positive accepting

person. In an earlier chapter the point was made that the teacher need not and should not shower affection and kindness upon his or her pupils. It is worth noting that in group therapy children are not supposed to touch the therapist, nor the therapist, the children. Perhaps the teacher can best play the role suggested here by assuming an objective and completely impartial attitude; by accepting all children, none more than another; by a high level of teaching competence and a willingness at all times to help each child with his schoolwork as he needs help, bearing in mind that too much help may cultivate dependence and too much eagerness to help may lead to feelings of inadequacy upon the part of the pupil.

We do not always know what the emotional needs of specific children are. We know them in a general way for all children; but we may not know how adequately or inadequately these needs are being met in a given child. As suggested earlier, this may be just as well. It is supposed that from such a teacher as has been described, the pupil will draw such strength as he needs.

Success. Every child needs the strength that comes from successful work experience. In a competitive society, failure to satisfy this need engenders feelings of inadequacy. Plant has drawn the following distinction between security and adequacy: security, which really means security in the love and affections of others, should derive from *who* one is; feelings of adequacy, which is based upon accomplishment, derive from *what* one can do or has done.¹⁹ The pupil will have to pay a price to achieve feelings of adequacy. The child should not have to do anything except be born and live in the home to merit his parents' love and acceptance. To receive his teacher's unconditional acceptance he should have to do no more than go to school. Admittedly, as the pupil grows older it may become difficult to separate these two concepts, security and adequacy. In the workaday world security in the affections of his colleagues, and of the people who employ

¹⁹ J. S. Plant, *Personality and the Cultural Pattern* (New York: Commonwealth Fund, 1937).

him, may be colored somewhat by his accomplishments. This may be true to an extent in high school and college. It may of course happen that in the home and in the elementary school attitudes of acceptance by parents and teachers are colored by achievement, but this would seem to be less excusable than at the adult levels.

One of the very important functions of the home is to provide a membership situation within which the child feels secure just because he is a member. A home that does not provide such a situation, but judges the child overmuch by what he is or does, rather than by who he is, runs a risk of missing its chance to fulfill one of its primary functions. Our schools should aim to serve the same purpose by fostering an environment of acceptance—by the teachers and by peers—in which the individual personality is respected.

The ego and the sense of self-worth which are crushed in problem children must be built up. A sense of failure is one of the more common causes for personality disturbances and social disorientation. . . . Success gives one a sense of self-worth, which is essential to wholesome character formation. The need of success is . . . derived from culture, and is determined by comparison with others. When comparison is unfavorable, feelings of inferiority and interpsychic tensions are set up which may find release in dissocial or neurotic behavior. . . . A situation in which the child can function without feelings of inadequacy, failure, and guilt may be the center of psychotherapy.²⁰

If a situation in which a child can function without feelings of inadequacy, failure, and guilt (and without censure, faultfinding, and scolding) is good psychotherapy, it should be good mental hygiene for normal school children who are not in need of psychotherapy. In group therapy the child's needs for status and success are met by (1) praise and encouragement, (2) the therapist's acceptance of the child, (3) the group's acceptance of the child, (4) the child's feelings of belonging to the group, (5) friendships formed in the group, (6) recognition at home and

²⁰ S. R. Slavson, *op. cit.*, p. 20. Quoted by permission of the publishers.

school of work done in the group, and (7) unconditional acceptance.

Probably most teachers would agree that it is our duty to provide school tasks that every pupil can execute with a reasonable measure of success. Here is something very tangible that the teacher can do, notwithstanding the difficulties, to help the child accept school—one of the major conditions of his life—with reasonable and continuing satisfaction. Success in school is discussed further in connection with the next topic.

Social acceptance. One of the major values in group therapy claimed by Slavson is the opportunity provided for experience in group relations and the opportunity to gain group acceptance. It seems obvious that genuine acceptance by others contributes enormously to an individual's acceptance of himself and the conditions of his life with satisfaction. Especially important, as Slavson suggests, is genuine praise spontaneously given one to another.

Socialized schoolwork and all kinds of school activities, extracurricular and others, and out-of-school activities built upon the social ties formed in school—all these contribute to feelings of belonging. Militating against this is the fact (see Chapter II) that these school ties tend to form along social-class lines. This is aggravated by the fact that lower-class youth, who are in the majority, do not as a rule form warm friendship and social-clique ties within their own ranks to the extent that upper- and middle-class youth do. Also militating against group solidarity and the realization of belonging are the competitive aspects of our schools. Not only is there competition for membership in in-school and out-of-school activity groups, but also competition for marks, for positions of academic leadership, and for recognition by teachers and school authorities.

The results of a highly competitive atmosphere in the classroom may undermine a pupil's feeling of belonging and group acceptance. Equally regrettable is the damage it may do to a pupil's feelings of adequacy. Instead of success and recognition,

there is always the danger that many will reap failure and disappointment.

As has been said, the teacher and the school can make a genuine contribution to mental hygiene in the school by providing rich and varied ways for pupils, *all* pupils, to achieve success and recognition. Ideally, every pupil, but especially those most in need of it, should have the opportunity to make contributions to the learning activities, contributions that others will recognize. Some pupils will require help in this. There is always the danger that the good pupil will get the lion's share of praise and recognition. It is suggested that socialized schoolwork, featured by mutual helpfulness rather than open competition, is a good point of departure. If teachers can have good morale and class unity, if they can create unified social objectives in their learning activities, with attention centered upon the objectives, the spirit of mutual helpfulness stands some chance of thriving. Under the right conditions, it seems, there is a good chance that pride, loyalty, and feelings of success that are derived from group achievements and from group associations can contribute enormously to the pupil's satisfactions with school life. This may to some extent satisfy or reduce the need of personal recognition and success. For many pupils this could be a wonderful thing.

Leisure time. To say that children need worth-while activities to occupy their leisure time is to denote a need, but not necessarily one of the same class as those just considered. This is not something a child can *feel* in the sense that he feels his lack of security, success, and social acceptance. When we say he needs worth-while and challenging leisure-time activities we are saying they are good for him. Unless he has cultivated an interest in some such activities he may not be conscious at all of their non-fulfillment.

Such activities simply contribute to human happiness and contentment. They make one's life seem more eventful and worth while. In this sense they contribute to a pupil's acceptance of himself and the conditions of his life with satisfaction. In this sense such activities represent good mental-hygiene practice.

Probably there is nearly always some frustration in his not knowing what to do, or in not having anything to do that he wants to do. Obviously, the school can play a part in the development of worth-while interests and hobbies.

Summary. Under the heading Basic Needs of Children we have considered those needs, at least some of them—love and security, success, social acceptance, leisure-time activities, and the need to express aggression—the satisfaction of which seem to contribute most to adjustment to life in a complex society. There are different names for these needs and different ways of classifying them. Thomas' well-known "four wishes"—recognition, security, response from others, and the desire for a new experience—represent one approach. In addition to biological wants and general physical well-being, Pintner and his collaborators suggested the following: (1), success, mastery, achievement; (2), recognition, admiration, respect, approval; (3), love and realization of being wanted; (4), peace of mind, freedom from worry; (5) adventure, new experiences, zestful living.²¹ Most or all such terms can be classified under some such heading as motivation toward a sense of self-worth, the realization of which is the key to acceptance of an individual's self and the conditions of his life.

In this discussion the goal of self-acceptance has been kept constantly before the reader. There may be something akin to reflexive action here. As the individual grows in self-acceptance and self-realization it becomes easier for him to accept others. As his anxieties are allayed, and as his need to express aggression toward others decreases, we would expect his tolerance to frustration to increase. We would also expect him to be able the more readily to accommodate himself to others and the pressures of life in general. This appears, therefore, as one fruitful approach to the betterment of social behavior, and the consequent reduction in dissocial behavior.

²¹ R. Pintner, J. Eisenson, and M. Stanton, *The Psychology of the Physically Handicapped* (New York: Appleton-Century Crofts, 1941).

Hieronymus has suggested an interesting schematization of human needs, as follows:



Discipline as Mental Hygiene

"If I were rating schools," Professor Howard Lane once said, "I would give the highest ratings to those in which one could not tell at a given time whether or not the pupils were in recess." One may suppose that he did not wish to be taken too literally. In a figurative sense the statement says a great deal. Dewey had something like this in mind in the 1890s in launching the movement he called the *new education*. This movement was child-centered. It envisaged child-centered schools, activity schools. Among other things, the "new education" allowed the child much greater freedom—freedom of activity, freedom of choice, freedom to move about, to confer with others. In his lecture "The School and the Life of the Child" (1899) Dewey relates his experiences in trying to find some desks and chairs suitable for young pupils in the new school. One dealer who seemed to discern his problem better than others remarked: "You want something at which children can work; these are all for listening."²²

²² J. Dewey, *The School and Society* (Chicago: University of Chicago Press, 1900).

It is natural for young children to be active. Instead of reflection, we find activity. Children like to work and play together. Many teachers channel these social tendencies into learning activities. Here mutual assistance becomes a virtue. Helping others in the performance of socialized learning activities, instead of being a form of charity, which, as Dewey said, hinders the education of the recipient, may be helpful both to the one who gives and to the one who receives.²³

There is a vast difference in the spirit of a class in which the learners are employed individually in executing a formally imposed task and one in which they are engaged collectively in working at a project in the planning of which they have had a share. There will, of course, be individual enterprise and responsibility, but the individual contributions are pooled in the spirit of mutual helpfulness.

The classroom in which we can "hear a pin drop," by some standards the paragon of good discipline, is not a wholesome place for a child to live, work, and grow. Children are active, happy, uninhibited, and vivacious when at play. This is a normal circumstance when healthy young children get together. How is a teacher to secure the order that some have prized so highly in the classroom? The writer can think of about three ways, in general. One way is by keeping the children so occupied with tasks which the teacher has set that they have little time to make disturbances (the alternative to quietness, by some considerations). Next, some pupils seeking the teacher's favor remain still so as not to incur her displeasure. Last, others may be inclined to this state out of fear. No one of these, nor the group of them taken collectively, represents a good school from the point of view of the pupil.

The only alternative to rigid discipline, to quietness, is not anarchy. In between there is orderliness of activity and work. The playground well populated with children is a noisy place. It is seldom rightly characterized as anarchy or bedlam. There is likely to be purpose and orderliness in the activity. To what pur-

²³ *Ibid.*, p. 29.

pose are children kept quiet, unless it is to provide a breeding ground for mischief? To what purpose are they kept under the firm discipline of teachers and school authorities? Could one think of a situation better calculated to ensure the really important elements of discipline than that provided on the playground when the child is learning group participation, or in the classroom when he is given a chance to learn to work with a group in carrying out learning activities in a purposeful way? Here children are given discipline of a kind that tends toward a purpose having some social usefulness.

In a certain state school for mentally retarded children, to take an extreme example, the children at the age of sixteen are eligible for vocational placement, under supervision, outside the institution. Some do not succeed in outside employment and have to return to the institution. The writer is informed by the director of instruction that the graduates rarely, if ever, return for deficiencies in reading, spelling, arithmetic, and so on. Nearly always the difficulty arises from problems of social adjustment. Some of these boys and girls have never lived in a home, or did so only in the earliest years of life. In the institution, which like many is overcrowded, the children have lived on wards. They have had no rooms to care for. They bathe on schedule, because of limited facilities and as a part of the routine of the institution. After taking a bath they pass by a supply room where clean clothes are handed them in a package. Children cannot learn proper personal hygiene practices, or learn how to select and wear their clothing, or handle money, or learn how to live on good terms with others in a relatively free society, without having had the opportunity to participate in these things.

How does working by oneself in school, keeping quiet, obeying the school's rules and regulations, prepare the pupil for participation in life outside of school? Co-operative participation in the planning and execution of learning activities might do so, as participation has in it some of the elements of life outside the school.

Quality of Participation

It is not sheer participation in school activities but *rewarding* participation that really counts. This is true whether we focus attention on the narrower aspects of scholastic achievement or on the broader aspects of child development.

With respect to scholastic achievement, especially, there is an important question of the level of participation. There is a suspicion that a *general slackness has pervaded American schools*—a suspicion that, although our schools are much better prepared to teach and our students are much better prepared to learn than say thirty or forty years ago, they are not achieving so well. This, if true, is a serious matter. First, it is serious because the pupil, in proportion to any slackness that may exist, misses a chance to become an educated person. In the second place, it is serious in the sense that such a situation creates a poor environment. It represents bad mental-hygiene practice on the part of the school.

It has been said that a well-adjusted person is one who can accept himself and the conditions of his life with fairly persistent satisfaction. Going to school is one of the most significant conditions of a pupil's life. Several things are required for his acceptance of this condition with continuing satisfaction. For one thing, he needs some good friends. He needs acceptance by a group of peers. Since belonging to a peer group is one of the basic human needs, the fulfillment of this condition is necessary to satisfactory adjustment. But our concern at the moment is with standards of academic achievement. Since academic learning is the most important reason for going to school in the first place, a sense of success and of the worth-whileness of the endeavor is probably the most crucial condition to the pupil's acceptance of school life with satisfaction. It is of the greatest importance that the pupil have a realization of educational growth, and in important directions. To this end he must achieve. Also, the quality of achievement often makes the difference between the realization or non-realization of this sense of worth-whileness. Growth in the ability to do independent thinking, growth in the ability to do creative

work, creative thinking—at least creative for him—and growth in the ability to work co-operatively and effectively with others, should contribute most to a sense of the worth-whileness of school. Slackness in schoolwork is poor discipline and poor mental hygiene.

As urgent as the matter of the upgrading of schoolwork is, it cannot be achieved, at least not satisfactorily, simply by making schools tougher. For one thing, this would tend to exclude many pupils now in school, especially in high school. This would tend to reduce the percentage of pupils of high-school age attending high school. As was maintained in Chapter XI, simply raising standards, at least standards of passing work, will not affect average and superior pupils. These are the levels at which high achievement really counts anyway. What we teachers should undertake to do is to improve the morale of our schools. In some of our schools it will take time, sometimes years perhaps, to bring about conditions in which high-grade work will be accepted as a goal of the pupils. We must take the pupils along with us in our attempts to improve the excellence of schoolwork. The attempt to do this arbitrarily and before the pupils are generally ready for it is to defeat the purpose of creating conditions in which the pupil can accept school life with continuing satisfaction to himself.

We should not lose sight of a twofold purpose: satisfyingness of participation and quality of participation. We are vitally interested both in the child and in his education. The ends of a good education can be made to serve the purposes of good mental hygiene.

Character Development

The end of mental hygiene is the prevention of social and emotional maladjustment. It should operate through the arrangement of a good environment in which the child can learn to satisfy his normal needs. Actually, the school can exercise effective controls only over the school environment. Many children come to school

with varying degrees of maladjustment. Some feel rejected in their homes; others, through having been neglected, have failed to develop normal concern about social approval and disapproval; still others have been unable to effect wholesome social relationships with siblings, peers, and adults in the community. Thus when we think of mental hygiene in school situations we not only have in mind preventive measures, but also ameliorative and restorative measures.

Perhaps some of our difficulties with pupil behavior, at least some of those of minor sorts, are of our own making. Incidentally, we need greater sensitization to the distinction between disturbances in school that more or less grow out of normal proclivities of children and young adolescents and those of a more serious nature. Some are indicative of serious maladjustment. Others are symptomatic of the need to have a little fun, to put the teacher to test, to protest against the bonds imposed upon children by adults, or even to express aggression toward the teacher or the school regime on account of frustrations experienced at their hands. These forms of behavior are not serious to the pupil. They are to some extent a normal part of juvenile mores. They should not be at all serious in school except as teachers make them so.

There has been a time-honored attitude that children must be on their best behavior in school. Indeed many children are prepared for this attitude when they enter school. Parents have given them to understand that in school they will have to obey; that meritorious and appropriate punishment will be used to enforce obedience and conformity to the rules of the school. They should, however, be led to expect to lead a perfectly normal life in school. This includes conflict among children, just as it does among adults, with the difference that adults are more likely to have learned ways of avoiding some of the violence of conflict. Children of school age have learned to expect disagreements, emotional outbursts, a certain amount of rudeness on the part of peers, siblings, and even parents. It should not surprise them that these things are to be found in school, except that they are led to believe that they will not be tolerated.

The very fact that traditionally we have adopted in effect the point of view that pupils cannot follow a line of behavior that is normal for them, puts the teacher in the unfavorable position of having to keep order. If the teacher is responsible for keeping good order at all times, disturbances must be dealt with as they arise. Some of these really do not need to be dealt with at all. Others of a more serious consequence to the pupil that should be dealt with cannot be intelligently handled on the spot. When the teacher is charged with the responsibility of keeping order at all times and at all costs, she cannot take an objective attitude toward pupils who misbehave. She is really not free to try to get at the underlying causes or to plan a long-range course of action. She must feel that the difficulty rests with her and reflects unfavorably upon her, which may not be true at all. In fact it may be that the pupil's bad conduct at school is connected with an overstrict discipline at home.

We should frankly face the question of what is accomplished by strict discipline, by enforced obedience, in the first place. We may think we are teaching the child that he cannot do certain things without reaping the consequences. Actually, all we may be teaching him is that he cannot do these things with impunity in the presence of certain adults. With enough punishment and threat of punishment, we can secure *conformity*. This is likely to be effective only so long as persons in a position to enforce it are present. But there is no guarantee that this will lead to *acceptance*, which is really the essence of character formation.

We may easily be deceived about the force of habit in such matters. Habits are not self-sustaining. They do not persist just because they have been formed. How many young men who spent some time in a branch of the military service continue to arise at an unreasonably early hour in the morning after they become free to do otherwise! Habits are formed, as has been said before, because the component acts are performed and reinforced. Habits thus formed persist and survive in proportion to the extent to which they continue to satisfy motivating conditions. If the controls, the reward and punishment, are imposed from the outside,

and do not come from within the person himself, the behavior is likely to persist only so long as someone is present to impose them. Indeed, the stricter the external enforcement, the more likely is the behavior thus exacted to fail of *acceptance* as good and desirable. We are all acquainted with the fact that strictness in a penal institution, to take another and extreme example, is notoriously ineffective in reforming the inmates.

It should be possible, of course, to build up through strict and severe punishment generalized fear reactions and anxieties to the extent that they will have inhibiting effects when no one is present to apply punishment. Punishment or fear of punishment—not merely physical violence, but that of abandonment, of loss of affection—may become so *internalized* that anxieties and feelings of guilt become ruling forces in a person's life. Naturally, this is not a desirable outcome.

As Slavson has said, character is formed by internalizing the restraints and controls imposed by the outside world.²⁴ At the outset of life all controls and restraints are applied by the outside world, people or circumstances. In addition to the authority of people, there are, as Slavson notes, pressures of various kinds—customs, ethical norms, economic circumstances, and the like—to which adjustment must be continually made. "The inhibitive principle which conditions one's reactions and behavior is established by accommodating oneself to the pressures from the outside." Slavson's concept of *positive identification* seems to come close to the heart of the matter. When the child makes positive identification with parents, teachers, or other persons, he accepts them, as we may say, as his own criteria. They then exercise authority in the proper way. As he accepts these persons and their behavior and aims, aspirations, and way of life, he *internalizes* these sources of control. He makes them his own. Now there is a mechanism of self-control, a mechanism of self-motivation and self-reinforcement of behavior.

Above all, children should be trained. They should be trained in the most general sort of way to fit reasonably well into the

²⁴ S. R. Slavson, *op. cit.*, p. 151.

mold of the society in which they live. They should be influenced and restrained in innumerable ways. Harsh measures, insistence upon strict and unqualified obedience, while they may be required in extreme cases, are not recommended as a virtue. They are not at all necessary to the rearing of normal children. It is a question as to whether they really ever accomplish their purpose. No doubt many children thrive and develop more or less normally in spite of such measures. Should they ever seem necessary in the case of a given child, it is only because control through fear and anxiety may be preferable to no control at all.

All behavior is regulated by the principle of reward and punishment. At the outset these controls are external ones, at least largely so. Any of the higher animals can conform to them to some extent. As these controls become internalized in the life of the child, either through positive identification or through fear, the mechanism is at hand for self-control. This is really the meaning of character: the ability to assume and pursue a course of action independently of immediate circumstances.

There is no denying the fact that fear and apprehension of disapproval and punishment are among the strongest restraining influences in our lives. But this does not have to be beaten into us by punishment or threat of punishment. Apprehension about doing wrong is a natural and an inevitable consequence of positive identification. Necessarily a person is apprehensive about the wrong when his concern about doing what he accepts as right is strong.

What is the mechanism of *positive identification*? At the common-sense level it may be said that a person is attracted to the people and the circumstances that serve as instrumentalities for the satisfaction of his needs. This is what we mean by reward. In Chapter X it was said that events associated with drive states become secondary drives; events associated with reinforcing states become secondary reinforcers; events associated with the satisfaction of secondary drives become secondary reinforcers; and absence of secondary reinforcers creates secondary drives. Here we seem to have the mechanisms for learning both *positive*

and *negative* identification. An adult, a parent, provides the events that are instrumental to the achievement of rewarding goal responses. Other accompanying events that originally had nothing to do with the making of the good response acquire secondary drive and reinforcing properties. These other accompanying events include the adult, and, as experience widens, other adults and members of the family, and ultimately the behavior, wishes, purposes, and so on, associated with them. The adult may also provide thwarting and punishing instrumental events, so that avoiding reactions may become rewarding. In this way negative attitudes and reactions may also become associated with an adult, as well as with his behavior, wishes, purposes, and the like. In this case *negative identification* occurs. To the extent that negative identification occurs, the adult can influence the behavior of the child in a given direction only so far as he, because of his superior size, is in a position to enforce it. With repeated rewarding of negative responses we have the mechanism, as generalization occurs, for the development of negativistic attitudes and negativistic children.

If the child first comes to school with strong positive identification with his parents and members of his family, and if they are the right sort of people, the teacher's task is made easy; and his principal concern is to avoid putting frustrating and punishing experiences in the child's way. In this the teacher will occupy a key position. But many children enter school without strong positive identifications, or with negative ones, or identifications with the wrong kind of people. In such cases the right kind of relationship with the teacher, with peers, and the right kind of learning experiences may be expected to contribute to the rehabilitation of the child.

Approaches to School Problems

In the foregoing pages considerable space has been devoted to group therapy. Other specialized procedures, play therapy and counseling, have been mentioned. It is hoped that this discussion

has furthered the reader's understanding of children and their needs. While it is not supposed that the classroom teacher can use any of these procedures directly, it is hoped that all the underlying principles can be adapted to school situations.

It is not supposed that the teachers, or for that matter supervisors and principals, will be able to cope with all the problems that school children present. Some require the service of more specialized persons, the counselor, the school psychologist, and the child psychiatrist. But until we teachers have made a try of our own, we do not know who the pupils are that need the services of these specialists. First we should try seriously to help all pupils who exhibit symptoms of maladjustment. This is in line with Cleugh's suggestion that in dealing with problem children we should try the simpler and usual things first.²⁵

"The simpler and usual things" we try does not mean the usual run of punitive or suppressive or authoritative measures that the teacher or the principal may be able to think of. At least we do not mean to stop with them. If such measures seem necessary, they should be thought of as "first-aid" measures, as Ojemann has suggested.²⁶ Any kind of persistent maladjustive behavior stems from certain causative circumstances. In school some of these may lie within the pupil himself, while others may stem from a provoking school environment. We should never lose sight of the fact that children are not all alike. An environment or a teacher that is quite satisfactory for one pupil may be quite unsatisfactory for another.

As Ojemann suggests, to treat only the symptoms may be to make the pupil more maladjusted. It has already been noted that many forms of behavior that are actually quite disturbing in classroom management simply grow out of the mores of young pupils, and may signify nothing more than a desire to liven things

²⁵ M. C. Cleugh, *Psychology in the Service of the School* (New York: Philosophical Library, 1951).

²⁶ R. H. Ojemann, "Personality Adjustment of Individual Children," *Department of Classroom Teachers, American Educational Research Association*, 1954.

up a bit. These may safely be suppressed as best the teacher can. However, many forms of misbehavior are symptomatic of deeper disturbances. These are problems for study, for consultation, and investigation. They may require consultation with other teachers, the principal, the psychologist, the counselor, the parents, the recreational worker. The aim of the consultation is not to have someone offer a good suggestion on how to handle the child, but to try to find out the source of the maladjustment. Obviously, this is not easy to do. With the resources at the teacher's command about the most that can be hoped for is a *reasonable hypothesis* based upon knowledge of the symptoms and knowledge of the out-of-school life and past life of the pupil.

Any intelligent ameliorative course of action must be based upon some hypothesis as to causative factors. The pupil may simply be lazy, the schoolwork may be too difficult or too easy. He may simply be disinterested. His parents may have exacting and unrealistic standards of achievement for him. He may feel insecure in the affection of his parents or feel rejected or neglected. This may carry over to his teacher. He may be suffering from deep-seated feelings of inferiority. He may have habits that render him socially unacceptable to his peers. Indeed, he may come from a social background in which what the school regards as dissocial and disturbing behavior has actually been rewarding.

It is easy for any of us to form wrong hypotheses as to the sources of a pupil's maladjustment. We may have to try again. It may take considerable time to arrive at a reasonably accurate diagnosis. It may take a considerably longer time to bring about any marked improvement in the pupil's adjustment. If the pupil's annoying drive to get his hand up first, to be the best in his class, to call attention to himself continually and to be in the center of things, stems from feelings of inadequacy or a greater need of success, attempts to suppress him do not help satisfy this need. On the other hand, reproof, sarcasm, and scolding remarks may aggravate rather than allay feelings of insecurity. They are not calculated to help the pupil who feels rejected or one who has developed guilt feelings.

It should be emphasized that we are not at present thinking merely of children who present disturbing problems. Timid, shy, sensitive children are as much our concern in good classroom management as those who make trouble in a disturbing way. Alas! if we must tackle every disturbing problem as it arises, and if we are judged overmuch by our ability to keep order, we are inclined to ignore retiring pupils who may really need help. As a group, teachers seem never to have been duly sensitive to the needs of pupils of this class.

It is sometimes said by parents of pupils (shall we say boys?) who are continually in difficulty in school that the teacher does not understand children very well—sometimes with the added intelligence that little else could be expected, since the teacher has not had any children of her own. The conclusion may be correct, at least in some cases, but not the explanation. It is fairly safe to assume that the teacher understands children as well as or better than the parents. At least the teacher has had some professional training for her job. A teacher does not learn to understand children by having a lot of them of her own, or by teaching a lot of them. Understanding children is a professional job; it requires some technical knowledge. This is why it is of the greatest importance that the classroom teacher have more than a perfunctory knowledge of the literature on mental hygiene and child development,²⁷ bearing in mind that much of what we observe in children comes out of our heads, not just from the children.

²⁷ F. Redl and W. W. Wattenberg, *Mental Hygiene in Teaching* (New York: Harcourt, Brace and Co., 1951); W. F. Vaughn, *Personal and Social Adjustment* (New York: Odyssey Press, 1952); W. M. Burbury, E. M. Balint, and B. J. Yapp, *An Introduction to Child Guidance* (New York: The Macmillan and Company, 1945); D. B. Klein, *Mental Hygiene* (New York: Henry Holt and Co., 1944); American Council on Education, Commission on Teacher Education, *Helping Teachers Understand Children* (Washington, D.C.: American Council on Education, 1945); J. E. Horrocks, *The Psychology of Adolescence* (Boston: Houghton Mifflin Co., 1951); W. Olson, *Child Development* (Boston: D. C. Heath and Co., 1949); K. C. Garrison, *Psychology of Adolescence* (New York: Prentice-Hall, 1951); R. J. Havighurst, *Human Development and Education* (New York: Longmans, Green and Co., 1953).

If the problems of classroom management, if teacher-pupil relationships, human relationships in the classroom, and such could be encompassed in a set of specific rules, the teacher's task would be an easy one. If this could be done, little training would be required to become a good teacher, just as little training would be required of a pediatrician if childhood diseases could be handled by a set of rules. Even so, persons engaged in the training of teachers, educational psychologists, for example, have not interpreted mental-hygiene principles and practices very well, at least not in a way nor to an extent that they function as they should in the work of the teacher. There is enough knowledge of this sort, were it organized and assembled and understood, to enable teachers to do an incomparably better job in the classroom than they are doing.²⁸

Ojemann and his associates have in recent years been exploring the possibilities of instructing young pupils in some of the concepts of behavior and some of the underlying causes of maladjustments. This appears to have been done successfully through narrative accounts of maladjustive behavior involving fictitious names of students, followed by discussion of probable underlying causes. Short dramatic presentations involving animals as characters have also been used. It is thought that the latter course helps to forestall the pupils' tendency to identify the "bad character" with some member of the class. This work also suggests that classroom tensions and conflict can be reduced through a series of conferences and discussions with teachers directed toward an understanding of the causal factors in pupil behavior, as opposed to attacking the symptoms.²⁹

²⁸ American Council on Education, *op. cit.*; C. Buhler, F. Smither, S. Richardson, and F. Bradshaw, *Childhood Problems and the Teacher* (New York: Henry Holt and Co., 1952)

²⁹ R. H. Ojemann, *op. cit.* and "An Integrated Plan for Education in Human Relations and Mental Health," *Journal of the National Association of Deans of Women*, 16 (1953), 101-08; F. S. Stiles, "Developing an Understanding of Human Behavior at the Elementary School Level," *Journal of Educational Research*, 43 (1950), 516-24.

ADDITIONAL REFERENCES

- Bach, G. R., *Intensive Group Psychotherapy* (New York: Ronald Press Co., 1954)
- Bender, L., *Aggression, Hostility and Anxiety* (Springfield, Ill.: Charles C. Thomas, Publisher, 1953)
- Blair, G. M., "What Teachers Should Know about the Psychology of Adolescence?" *Journal of Educational Psychology*, 41 (1950), 356-61
- Bruce, W. F., "How Can the Psychology of Development in Infancy and Childhood Help Teachers?" *Journal of Educational Psychology*, 41 (1950), 348-55
- Cober, M. E., "Creativeness in the Language Arts," *Elementary School Journal*, 53 (1952), 96-99
- Crow, L. D., and Crow, A., *Mental Hygiene* (New York: McGraw-Hill Book Co., 1951)
- Cruze, W. W., *Adolescent Psychology and Development* (New York: Ronald Press Co., 1953)
- Deutsch, M., "Social Relations in the Classroom and Grading Procedures," *Journal of Educational Research*, 45 (1951), 145-52
- Dollard, J., Auld, Jr., F., and White, A. M., *Steps in Psychotherapy* (New York: The Macmillan Company, 1953)
- Fisher, B., "Group Therapy with Retarded Readers," *Journal of Educational Psychology*, 44 (1953), 354-60
- Forest, I., *Child Development* (New York: McGraw-Hill Book Co., 1954)
- Ganz, M., *The Psychology of Alfred Adler and the Development of the Child* (New York: Humanities Press, 1953)
- Gondor, E. I., *Art and Play Therapy* (Garden City: Doubleday and Co., 1954)
- Hall, W. E., *et al.*, "Multi-factor Effect in Change in Human Behavior," *Journal of Educational Research*, 45 (1951), 49-54
- Harms, E., *Essentials of Abnormal Child Psychology* (New York: Julian Press, 1953)
- Jenkins, D. H., "Interdependence in the Classroom," *Journal of Educational Research*, 45 (1951), 137-44
- Jersild, A. T., *Child Psychology* (New York: Prentice-Hall, 1954)

- Jones, M. C., and Bayley, N., "Physical Maturing Among Boys as Related to Behavior," *Journal of Educational Psychology*, Vol. 41 (1950), 129-48
- Kanner, L., *Child Psychiatry* (Springfield, Ill.: Charles C. Thomas, Publisher, 1948)
- Lehner, G. F. J., and Kube, E., *The Dynamics of Personal Adjustment* (New York: Prentice-Hall, 1954)
- Lindberg, L. H., *The Democratic Classroom: A Guide for Teachers* (New York: Teachers College, Columbia University, 1954)
- Lindgren, H. C., *Mental Health in Education* (New York: Henry Holt and Co., 1954)
- Millard, C. V., *School and Child, A Case History* (East Lansing, Mich.: Michigan State College Press, 1954)
- National Association for Mental Health, *Forgotten Children*, 1953
- Ojemann, R. H., *The Child's Society* (Chicago: Science Research Associates, 1953)
- Pepinsky, H. B., and Pepinsky, P. N., *Counseling: Theory and Practice* (New York: Ronald Press Co., 1954)
- Rogers, C. R., *Client-Centered Therapy* (Boston: Houghton Mifflin Co., 1951)
- , and Dymond, R. F., eds., *Psychotherapy and Personality Change: Coordinated Research Studies in the Client-Centered Approach* (Chicago: University of Chicago Press, 1954)
- Smith, M. B., *The Diminished Mind* (Chicago: H. Regnery Co., 1954)
- Topp, R. F., "Preadolescent Behavior Patterns Suggestive of Emotional Malfunctioning," *Elementary School Journal*, 52 (1952), 340-43
- Wattenberg, W. W., "Eleven-Year-Old Boys in Trouble," *Journal of Educational Psychology*, 44 (1953), 409-17

THE PROFESSION OF TEACHING

The Prestige of Teaching

ONE OF THE FIRST QUESTIONS that arises when the prestige of teaching is mentioned is: How do the teaching occupations compare with other common occupations? Another question is the prestige accorded teaching in relation to other occupations by persons of different social classes. Let us start with the larger question of whether or not the prestige of occupations in general varies with social class.

It is somewhat surprising in a way to learn that there is a great deal of consistency in the status of all occupations as rated by persons of different social-class levels. This has been shown to be the case when high-school students are asked to rate occupations as to prestige and when parents of high-school students are asked to make the ratings.¹ Anderson secured the co-operation of a group of parents of tenth-grade students in rating separately the 93 occupations in his list of common occupations. Equal numbers of parents were drawn from each of four socioeconomic groups as determined by the Warner Index of Status Characteristics (see Chapter II). The ratings were made upon the basis of a 5-point scale, 1 for occupation held in highest respect, 5 for the occupa-

¹ E. C. Mickey, "High School Student Ratings of Occupational Prestige," Master's Thesis, State University of Iowa, 1948; W. F. Anderson, Jr., "Attitudes of Parents of Differing Socio-Economic Status Toward the Teaching Profession," *Journal of Educational Psychology*, 45 (1954), 345-52.

tions held in very low respect. A sample of the occupations listed and the ratings assigned to them by fathers and mothers in each of the four social classes is shown in Table XXXIII.

TABLE XXXIII

MEAN PRESTIGE VALUES OF OCCUPATIONS FOR SONS BY
SOCIAL CLASS OF RATERS

<i>Occupation</i>	<i>Upper-class</i>	<i>Upper-middle Class</i>	<i>Lower-middle Class</i>	<i>Lower-class</i>
Surgeon	1.0	1.0	1.0	1.0
College President	1.1	1.3	1.2	1.8
Lawyer	1.3	1.5	1.3	1.8
College Teacher	1.4	1.5	1.5	1.8
Supt. of Schools	1.4	2.0	1.5	1.9
High-school Teacher	1.6	1.8	1.7	1.9
Newspaper Editor	1.8	2.2	1.7	2.1
Veterinarian	1.8	2.0	2.0	1.9
Factory Manager	1.9	2.0	2.0	2.5
Rural School Teacher	2.4	2.5	2.8	2.3
Policeman	3.0	2.6	2.5	2.0
Bank Teller	2.9	2.8	2.1	2.9
Lumber Dealer	3.2	2.7	2.4	2.4
Carpenter	3.2	2.8	2.2	2.5
Hardware Dealer	3.0	2.7	2.7	2.7
Mail Carrier	3.4	2.9	2.9	2.7
Plumber	3.2	2.4	2.4	2.7
Traveling Salesman	3.0	3.0	2.8	3.8
Sales Clerk	3.6	3.4	3.7	3.6
Delivery Man	4.0	3.8	3.5	3.5
Waiter	3.8	4.0	4.1	3.9
Bartender	4.7	4.6	4.5	4.3

From this table it is seen that the status of the occupations, as signified by mean ratings, does not vary a great deal with social-class position. Anderson concludes that the various occupations are held in about the same degree of esteem by the parents in the four different socioeconomic groups. This is true for the 22 occupations presented in Table XXXIII and for all the 93 occupations used in his investigation.

Another interesting and heartening fact to be observed is the

relatively high prestige accorded all of the educational occupations. In keeping with the tendency for the other occupations, it may be observed that the educational occupations are held in high esteem by parents of all four social classes.

Among other things, the parents in this investigation were asked to rate each of the 93 occupations as to desirability as future occupations for their tenth-grade sons or daughters. As before, a rating of 1 signified those of highest desirability, and 5, those of least desirability. It was not surprising to find that the mean ratings of desirability showed a decided tendency to vary with the social class of the parents. For many occupations this tendency was quite pronounced, as one would expect. It does seem surprising, however, to find that ratings on desirability of educational occupations decreased as socioeconomic class decreased. The highest ratings are associated with upper-class parents, the lowest with lower-class parents. The results for three teaching occupations are shown in Table XXXIV.² Results on

TABLE XXXIV

MEANS AND STANDARD DEVIATIONS OF THE DESIRABILITY OF
TEACHING OCCUPATIONS FOR SONS AND DAUGHTERS OF
DIFFERING SOCIO-ECONOMIC STATUS

		<i>College</i>		<i>High School</i>		<i>Grade School</i>	
		SON	DAUGHTER	SON	DAUGHTER	SON	DAUGHTER
Upper-class	Mean	1.8	1.7	2.5	2.0	2.9	2.8
	SD	1.0	0.7	0.9	1.1	1.1	1.2
Upper-middle	Mean	1.8	2.5	2.3	2.4	2.8	2.2
	SD	0.8	1.0	1.2	1.0	1.1	1.0
Lower-middle	Mean	2.4	2.7	2.8	2.9	3.2	2.7
	SD	1.5	1.5	1.4	1.4	1.4	1.3
Lower-class	Mean	3.1	2.7	2.8	2.2	3.1	2.3
	SD	1.5	1.3	1.4	1.3	1.4	1.0

NOTE: The lower the mean the higher the attitude of desirability.

² Tables XXXIII and XXXIV are reproduced by permission of the *Journal of Educational Psychology*.

"suitability" of teaching occupations for sons and daughters are similar to those on "desirability."

The relatively low desirability and suitability ratings assigned the teaching occupations by parents in the lower social class in comparison with those in the upper social class seem especially surprising in view of the fact that teachers tend to be recruited from the upper-lower and lower-middle classes, which by the way may be average or better in the entire distribution of families in America. As was seen in Chapter II, the various social classes are not made up of equal numbers of citizens. (The two upper classes combined comprise 3 per cent of the population; the upper-lower class alone, 34 per cent.) In the second place, it is not taken for granted that families in one social class are any better or more honorable than those from another. We expect a family to prove its worth regardless of social advantages or disadvantages.

A recent investigation by Edwards suggests that the male teacher comes from homes far above average in many desirable traits, although the Warner scale does place their homes of origin in the upper-lower and lower-middle classes, in the main.³ The homes of origin are characterized by various kinds of stability. Their parents are rooted in community life. By and large, they own their homes and have done relatively little moving from community to community. An extremely high percentage of the parents vote regularly in local, state, and national elections, belong to churches, and participate actively in religious and civic affairs in the community.

One would suspect that the percentage of teachers coming from farm and rural areas is disproportionate to the percentage of people in the United States living in such areas. It is a well-known fact that families on farms are large and also that the number of adults living on farms is decreasing. There is in America, as in other countries, a surplus population on the farms. It also seems that the life and work of a teacher is likely to appeal

³ N. Edwards, "Sociology of Teaching: II. A Study of the Male Classroom Teacher," Doctor's Dissertation, State University of Iowa, 1953.

to farm families. Perhaps on the average one son and one daughter can be absorbed in the rural community; the others must go somewhere else. A teacher's college opens up one possibility.

Several interesting problems remain to be explored, or investigated more thoroughly. There are over a million teachers in the United States. Perhaps there is an equal number of former teachers, just as a guess. The number of former teachers may be much larger than the number of active teachers. Whatever the case may be, the number of teachers and former teachers is sufficiently large to focus attention upon the teacher as a citizen.

Edwards' investigation suggests that while the male teachers, because of the magnitude of their income, may live in communities of modest pretensions, they maintain good homes. The evidence of cultural interests within the home is out of proportion to the external appearances of the community in which the family lives. The teachers' children give evidence at school of being well reared. It is quite probable that the percentage of teachers' children graduating from high school and college and ultimately finding favorable employment would far exceed that of children of other families of equal income.

Many teachers of both sexes leave the profession after a longer or shorter time. It must be admitted that teaching is often regarded as a steppingstone. It would be fruitful to know how well it serves this purpose and to what extent it is a stopgap rather than a steppingstone. What kinds of occupations do men enter when they leave teaching? Do favorable effects of their training and experience still show up in community participation and in the rearing of their children? We know what a great many of the women do when they leave teaching. They get married. How favorable are these matches to the woman teacher? Does teaching assume, in this respect, a position of importance in upward class mobility? Do the effects of teacher training and teaching experience carry over favorably into homemaking and child rearing?

Taking Stock

If Anderson's results are at all typical, we teachers may conclude that in the eyes of our citizens ours is a highly respected and honored vocation. The discussion in this section of the present chapter centers on our own concern about our profession. How do we feel about our professional competence and intellectual stature, for example? Do we as well as others regard our work as being quite as important as that, say, of the doctor or the lawyer? No doubt there are many fine teachers who are relatively just as competent professionally as doctors and lawyers, but as a group we are not as competent. Many of us begin teaching at the age and at the academic level at which the doctor or the lawyer begins his professional training. We have to weigh this situation in part in the light of a larger context. If a doctor or a lawyer were required for every thirty or forty children in the population, he would probably be less highly specialized than he is now. More than that, he, at least the average person in his profession, would also be less intelligent and less well educated.

Our concern here is about things we can do, within the context in which we work, to make our profession more satisfying to ourselves. Perhaps our first thought, like that of most others, concerns income. Naturally, we feel this could be improved upon. Although educational expenditures have increased enormously within the last decade, the percentage of our national income expended on education is less than it was formerly. It may well be true that all educational expenditures should be increased and that teachers' salaries should be further increased, but this does not get at the heart of the difficulty, so far as satisfaction with teaching goes. At least, it is only part of the problem.

Associations of teachers and other like bodies do not seem to have a grasp of the underlying basic difficulty. To come to the point, the complaint here concerns the fact that in our public schools there is no way of rewarding merit. At least, this is practically true. Most efforts to improve the financial position of teachers that come to mind have been centered largely on mini-

imum salaries. All too commonly minimum salaries are also the maximum—subject, of course, to some adjustment for years of experience and the number of professional degrees held. The latter qualification does not alter the fact that there are no real provisions for rewarding and recognizing merit. Within any given level of experience or professional training one might as well be a poor teacher as a good one so far as concerns any kind of external reward or recognition.

The teacher suffers, the pupils and the public suffer, from this kind of an arrangement. And it is not the teacher's financial suffering that is intended.

The beginning teacher is typically an immature and certainly not a highly trained professional person. Many, perhaps half, of those who begin teaching will leave the profession five or ten years afterward. They are not the people to be concerned about. Rather we are thinking about the people who make a profession of teaching.

Let us take the case of a young person who wants to be a teacher. He (or she) graduates from college with a sufficient number of professional courses in education to entitle him to a certificate or a Bachelor's degree, secures the certificate or the degree and a position, and begins his lifework. In due course he begins attending summer school, and at the end of the allotted number of summer sessions receives his Master's degree. This entitles him—hardly to a promotion, but—to an increase in salary, an automatic increase. If he remains a classroom teacher, he will really never experience a promotion. This is surely something to ponder! No wonder he is tempted to try for a supervisory or an administrative position, or to leave the profession altogether. But suppose he really likes his classroom work and elects to stay in it. Perhaps before he receives his M.A. degree he has already received an automatic increase in salary—for tenure, not for being any good. Most likely he will continue to receive small increments in salary for a few years, just for remaining in the system—not for merit, not even for good deportment. He can take no special pride in this, because all others similarly circumstanced, the good

the poor, and the indifferent, have received like increments. One fine day our teacher reaches his thirty-fifth birthday. About the most he can say as he takes stock is that this is it. With the larger span of his professional life still ahead of him, he is at the top. This condition is probably typical of no other profession. A college or university professor would be rash indeed to admit that such institutions of higher learning are well run, but in comparison with public schools they are models of perfection. At the age of thirty-five the professor feels that most of his advancement, reward, recognition, and often increases in rank are still ahead of him.

In the public schools there should be recognition of merit. There should be rewards in the form of salary, rank, or title, and recognition for continued growth and development. The teacher, as well as the pupil, needs to be able to accept himself and the conditions of his life with fairly persistent satisfaction. In a worldly world getting ahead in a person's vocation is one of the avenues to acceptance of the conditions of his life.

Most classroom teachers of fifty have long since passed the point of expectation of further remuneration or recognition. It can probably also be said that they have passed the point of any real growth in their competence. It is more than a possibility that these two things are associated. The teachers in a given system who are fifty years of age draw the same salaries, more or less, with due allowance for academic degrees and nonteaching duties. They cannot possibly be equally competent. Just to pin things down a bit, the suggestion is offered that at this age level there should be a differential of at least a \$1000 in annual salary between the best and the poorest teachers.

Why have not these things been done? For one thing, there is no clear indication that teachers want them done. This need not argue that poor teachers are in the majority. Perhaps as a group teachers have not really pondered its importance to their profession. Even the poorest teachers would greatly profit from such upgrading. It can scarcely be true that supervisors, principals, and superintendents do not know who the good teachers are. It

can be, and is, true that school administrators, and more especially local school boards, are hesitant to accept the local pressures that such a system would entail. Incidentally, whatever may be the merits of the local school board, which exists in no other country with the vigor that it has in America, this is certainly one of its evils.

No one supposes that mistakes would not be made in an arrangement by which teachers were rewarded upon the basis of merit. If the mistakes did not occur frequently enough to undermine morale, they should not be fatal.

What is in question here is a system in which our teacher at thirty-five can reasonably look forward, with some amount of good fortune, to years of growth, recognition, and advancement. Such a condition alone can give him the optimism and the confidence he needs in order to face his daily work with self-assurance.

Equally important to the teacher's acceptance of himself and the conditions of his life with fairly persistent satisfaction is the realization of genuine intellectual growth. As a group, we should expect to become wiser and better-educated men and women as we grow older. There are various reasons why this is something of a special issue in the lives of teachers. In the first place, we work with children and adolescents. If we are successful, we must adapt our thought and speech to their interests and their educational level. As a consequence we do not in the course of our professional work meet the challenge of adult minds with their wider range of interests and abilities. Since we work with the young, we are somewhat shut off from the affairs of the workaday world insofar as our vocation goes.

This situation should put us on our guard to keep up adult contacts during out-of-school hours. At best, our contacts with adults of the community will be somewhat limited. This puts us under the obligation to read more widely. Some of what other professional men and women learn from one another we must learn from books, magazines, and newspapers.

Let us scrutinize ourselves very critically at this point. The evi-

dence at hand, which admittedly is meager, suggests that we as a group do not read more, but less, than the average run of college-trained men and women. There is a reason for this, but it is certainly not that we lack interest or industry.

The principal reason seems actually to grow out of one of the teacher's virtues—his devotion to his work. There is always the pressure of record keeping, preparation of lessons, test making, committee work, sponsoring of activities, Sunday-school work, ad infinitum. All of this is symbolized by what may be called the teacher's homework. This homework is possibly the *most insidious and basic evil in our profession*. When is the teacher to cultivate the intellectual, cultural, and social side of his life if not in the evenings, on Saturdays and Sundays? Much of our schoolwork is not intellectually elevating, especially if we work with young children. How well the writer remembers the long evenings spent, or misspent, as a young teacher in reading high-school themes! It may not be literally true, though it seems so now, that he never learned a thing of consequence from that experience, literary or otherwise. Such work if persisted in, and if it absorbs most of the teacher's time, can only narrow rather than broaden his intellectual life.

The teacher stands to become a wiser and stronger person, a more substantial citizen, and in the long run a more competent teacher by devoting a greater share of his time to cultural, intellectual, and social pursuits and correspondingly less time to his schoolwork. Certainly his life stands to be more eventful.

In the preceding chapter it was noted that every child needs some worth-while activity to occupy his leisure time. This is equally important in the lives of adults, with the further proviso that they should actually have some leisure time, perhaps several hours a day.

How can this be managed? As a rule of thumb it is suggested that we stop the practice of taking schoolwork home with us. Casual observation suggests that teachers do not always make the fullest use of the school day. Let us say we will do a full day's work at school and let it go at that; that we will spend the rest

of our time as best we can in improving ourselves and in enjoying life. Many of our schools could be improved with more adequate work space for teachers in the buildings. It should not be necessary for the teacher to repair to the furnace room or the corner drugstore in order to have a smoke.

The importance of the teacher's having some good friends among the adults in the community can scarcely be overemphasized. Again, since he works with the young, this is especially crucial in the teacher's life. This is another reason why it is of the greatest importance that the teacher cultivate the intellectual, cultural, and social side of his life. He must be readily acceptable to other adults. He must be comfortable in their company, and they in his company. It is because adequate social contacts are sometimes difficult to manage, especially in the case of an older unmarried teacher, that we who teach should make it a matter of our special concern.

One final suggestion on this head. It is of the greatest importance to us and our profession that we dress well and appear well. Sometimes when we wonder if we can afford the garment we would like, it might be helpful to ask ourselves if we can really afford to wear the one we think we can afford to buy. We simply cannot afford to be frayed, seedy, or shabby. The trouble is, we are likely to feel the way we look. (I have no testimonials.) It is a rare female teacher that can afford to do her own tailoring. Most such efforts have that homemade appearance. In selecting clothing, good taste may be more important than the price. This applies to the professional teacher. If a woman is teaching a year or so to help her husband purchase a farm or establish a business, these issues are probably not too important, beyond the fact that a smartly dressed wife is very good advertising for her husband.

The Roles of the Teacher

In their chapter "The Psychological Roles of Teachers," Redl and Wattenberg list and discuss the following: representative of society; judge and screener; source of knowledge; helper in the

learning process; referee; detective; object of identification; limiter of anxiety; ego-supporter; group leader; parent surrogate; target for hostility feelings; individual friend and confidant; and object of affection.⁴ This is an impressive and well-considered list. In fact, it is a bit frightening. One wonders how any one person can adequately play all these roles, especially in view of all the diversity found in a typical classroom. Actually he (or she) cannot do so, in any assured and conscious way, for any given pupil.

The point has already been made that the teacher does not always know the role he plays in the life of a given child. In fact he may not have any very definite knowledge of a particular pupil's needs. We can spell out the needs of children in general fairly well, as is seen in the preceding chapter. Basically all children have the same needs. However, when we talk about a particular school child's needs we have in mind those needs that are not at the time being satisfied. For example, success is one of the basic needs of all children. This presents a special school problem only for those pupils for whom this need has not been adequately satisfied.

Since the teacher may not know in any very precise way what he signifies in the lives of individual students, he must rely upon some general rules of procedure. He can become a positive, accepting person from whom the insecure child can draw the emotional strength he needs. If the child has felt neglected or rejected by his parents, the teacher, somewhat in the role of a parent surrogate, can help satisfy the need of unconditional love and acceptance. He can do this, first of all, by assuming the role of a positive accepting individual. This is assumed, of course, for all pupils. Those in need of a parent surrogate may find one. Many pupils, perhaps most, are not in need of such a substitute.

The teacher may or may not know that certain particular pupils feel insecure in their social relationships with their peers. He can only infer this from their behavior. In any case it is safe to assume that there are some such pupils in most classrooms. It is not

⁴ Redl and Wattenberg, *Mental Hygiene in Education*, Chapter X.

imperative that the teacher be able to identify such pupils in order to help them. Even so, this is probably the teacher's most difficult role. In addition to many kinds of personal idiosyncrasy that may render a pupil unacceptable to other children, there may be large social-class differences to contend with. This may be a problem at all school levels, and particularly troublesome at the high-school level. As was seen in Chapter II, school cliques and school ties of various kinds tend to form along social-class lines. We have also considered differences in social acceptability at all grade levels. We have seen that in the typical classroom we find a few leaders or "stars," or pupils that are popular, and a larger number who are more or less isolated and neglected. The pressure of individual competition for good grades, for positions of honor and recognition, aggravates the situation.

There is a possibility that frank group discussions of the problems just mentioned would have some ameliorative effect. It also seems probable that leadership on the part of certain pupils can be utilized to foster a group spirit and a sense of solidarity that would be conducive to a sense of belonging. While security is not basically a function of achievement, inadequacies in achievement may lead to insecurity when it is linked with the attitudes of the group with which the pupil is identified. Group leadership may become a way of dealing with individual differences as those possessing leadership qualities are made to feel responsibility for the weaker members.

Under the right conditions of group morale and feelings of group solidarity, the leadership practices just suggested may benefit the pupil who helps and the one who is helped. When morale and feelings of solidarity are sufficiently strong, the weak student can experience certain satisfactions from group membership. The insecure pupil can derive emotional satisfactions from his identifications with the class and its members. Again, if conditions are right, the academically weak can derive some feelings of success from the success of the "team." Thus when conditions are ideal, the leaders do not stand as a constant threat to the status and the security of the weaker members of the class, as

must happen in a highly competitive social climate. Under these ideal conditions leaders become sources of pride and satisfaction to the other members of the group.

We are always faced with the fact that the academically weak student will have to live with this one of the conditions of his life. The teacher in his direct dealings with such pupils and in setting the social tone and attitudes of other members of the class becomes a key figure. Above all, the teacher and, through the teacher, the weak pupil's fellows, through their behavior, gesture, and attitude, should create the impression that his accomplishments are perfectly acceptable. Praise freely and spontaneously given for all constructive effort, as has been said before, is of the greatest significance. The slow learner must find a place for himself, a good place, in the classroom, as he must do later in society, if he is to develop into a happy, well-adjusted individual.

On the other hand, there is the gifted child. He should not be allowed to develop attitudes of superiority or habits of idleness. If school is to be a good place for him psychologically, he must realize his potentials for intellectual growth. His work must be challenging. It is not sufficient merely to give him "more" work to occupy his time. Much of his schoolwork should be qualitatively different from that of the class in general.

There is no place in a good school program for slackness in schoolwork. This is not good mental hygiene. The pupils should feel that they are learning something. A realization of genuine intellectual growth provides the best assurance that the pupil will accept school as an important feature of his life. But as has been suggested, this is not accomplished merely by the teacher's assuming the role of a hard taskmaster. Although everywhere the goal should be the gradual upgrading of schoolwork, we teachers must take our pupils along with us. We should not undertake to proceed faster than the pupils are emotionally prepared to go. At no time should the pupils be led to feel that our demands are excessive or unrealistic, or that they themselves are being driven. We should never lose sight of the emotional aspects of learning.

At present our concern is with the teacher's psychological role,

as ego supporter, parent surrogate, and so on. A really good teacher is in a favored position in this respect. It is tremendously important that the teacher really know how to teach school subjects, to give help, the right amount at the right time. A good teacher understands subject matter and knows how to help pupils learn. A good teacher also knows young children and adolescents and how to help them satisfy all their basic needs. One of these qualities really depends upon the other. Both are necessary. Neither is sufficient by itself.

When the teacher meets all the conditions we have been considering—understanding and wisdom in handling children and skill in teaching school subjects—it should not surprise us that the teacher has yet another role to play: a “target for hostility feelings.” In the last chapter the possibility that the need to express aggression is basic in human existence was discussed. We should accept the fact that pupils need to blame others for their frustrations. Who is a better target than the teacher? We should not be unduly sensitive about this. We should realize that we are not to blame, at least not necessarily so, for this situation. This is one of our roles. We should be quite willing to accept it. If we can thus take an objective attitude toward expressions of hostile feelings, we can at least avoid assuming the blame ourselves—we can if we are reasonably sure that our own house is in order.

There is little doubt that teachers as a group are deeply interested in the welfare, the entire welfare, of children and young students. This, probably, is the strongest reason for their entering the profession in the first place. The physician may also be interested in the entire welfare of his patients. But he has schooled himself in two important respects. First, he limits his activities in behalf of the patient to those aspects of the patient's total welfare which he is professionally competent to deal with. Second, he assumes an objective attitude toward the patient's illness. He does not feel personally responsible for it. He also realizes that he cannot restore all his patients to their former good health, or make them young again, or even save their lives. He can probably do a better professional job for all his patients if he does not

worry too much about, or feel personally responsible for, patients he cannot help.

As teachers we are not always responsible, probably rarely completely responsible, for the maladjustments of our pupils. Some of the hostility they express at school may arise from conditions over which we have no control. Moreover, we may be unable to help a pupil in need of help. Frequently we may not know how, or know whether or not, we have helped him. Like the physician, we can increase our professional competence by cultivating an objective attitude. We should also realize that there are many cases that we are not equipped to handle. They should be referred to the counselor or to the school's psychological or medical or psychiatric services. Many people the world over need help. Mankind needs help. Perhaps also the person who tries to help everyone in all kinds of ways is himself in the greatest need of help.

As a group we have a strong urge to be helpful; but like most others we are equipped to provide only a specific and limited kind of help. The parents may have too many children; the home may be demoralized or torn by dissension; the community may be in a state of deterioration. These things we cannot help, immediately at least; or if we can be of any help, it is by focusing our attention upon our defined task, as Cantor has suggested.⁵

Professional writing within the last twenty-five or thirty years has made us conscious of the whole child. The total effect of this point of view has probably been good. We teach the whole child, more or less, because he learns and reacts in terms of the kind of child he is. Many things have gone into his making. While we may teach the whole child, we are not wholly responsible for his development. The home, the physician, the church, the community, the scout leader, the playmates, and many other institutions and people have had a hand in his making. The teacher is employed to teach science, English, or the third grade with its spelling, arithmetic, reading and so on. This is the focus of the

⁵ N. Cantor, *The Teaching-Learning Process* (New York: Dryden Press, 1953)

teacher's work. It is for this work that he was trained. A teacher cannot be judged successful unless he produces at this point.

But there is another side to this. To teach means to teach something *to students*, really to get them to learn something. Much depends upon forthright teaching skill, as ordinarily encompassed by what we think of as teaching methods. Our success also depends upon the pupil, his receptiveness, how he feels about the teacher, how the teacher makes him feel about himself and his schoolwork, how he feels about his peers. Much depends upon his adjustment in general. As Cantor points out, learning is quite a personal thing. "Every pupil learns in his own way. . . . Learning depends upon wanting to learn. . . . The pupil learns what he is interested in learning."⁶ To amount to very much, learning activities must provide satisfying experiences. Obviously, the satisfactions may depend upon the child quite as much as upon the nature of the learning activities.

Therefore we must be interested in the pupil, the whole pupil, from the standpoint of his learning here and now in our third-grade class or in our class in civics. There is also the larger view that we are not merely helping pupils learn subjects but helping them grow up to become well-adjusted citizens.

There always arises the question of when and how we are going to help the pupil in the ways suggested in this and the preceding chapter. The classroom teacher will have to do this in the classroom and do so in the context of teaching whatever he is assigned to teach. Next to the parents, teachers are the most important persons in the child's life. How do the parents help him in his character development, emotional adjustment, social development, and in what we call personality in general? They do so most effectively in the way they live with and before him; in his early years in the way they feed, dress, and otherwise care for him. They do so by the expression of attitudes in all kinds of unconscious ways. They do so through help, love, restraint, and controls. All of these are provided in a context of daily living in

⁶ *Ibid.*, Chap. 12.

family life. The way in which the parents do all this is of the greatest consequence in the psychological life of the child. They cannot just rear or train the child. They must do this with respect to specific behavior situations.

The teacher works in a different context. No amount of formal parental instruction can make up for bad human relationships in the home. The teacher's task is to maintain good human relationships in the classroom. How does the teacher conduct the daily affairs of the classroom? If we can maintain the right kind of human relations, which is the meaning of good mental hygiene, we have provided the help we can give the pupil in respect to these matters.

It must be admitted that teachers today are much better equipped for their technical role of providing instruction in their subject matter than they are for playing the many other of the roles discussed in the last two chapters. There is available to them a rich supply of professional books on arithmetic, reading, the language arts, the social studies, science, music education, art education, and so on. Like richness is to be found in textbooks, workbooks, instructional materials, and collateral readings that can be placed in the pupils' hands. Comparable progress has not been made in the understanding of children and their needs. If comparable knowledge exists, it has not been made available to teachers in usable form. As we take stock of our profession today it must occur to us that this situation, perhaps more than any other, is in need of correction.

In the previous chapter the desirability of the teacher's reading widely in the general area of mental hygiene was pointed out. Several investigations have called attention to the need of greater sensitization upon the part of teachers to what may be called the psychological problems of children. Several years ago Wickman secured the co-operation of a group of teachers in rating as to their seriousness a standard list of 50 behavior problems. He also had a group of psychologists and mental-hygiene experts rate these same problems. When the two groups were compared it

turned out that many problems given low ratings by teachers received high ratings in seriousness by the psychologists. These were largely psychological problems that were serious for the most part only to the children who exhibited them, such as sensitiveness, timidity, dreaminess, withdrawingness. In general, those forms of behavior which posed problems in classroom management were accorded the highest ratings by the teachers.

As certain critics have pointed out, the instructions to the teachers and the psychologists were not the same. The latter were instructed to rate the problems upon the basis of their seriousness to the future development of the children exhibiting them. The teachers were asked to rate the problems upon the basis of the degree to which the behavior characteristics made the child a problem in school management. What we may conclude from the Wickman investigation is that those problems which the psychologists thought were most serious with respect to the child's future psychological development were not those which caused teachers the most trouble in the classroom. This of course was an important finding. It did not prove, however, that teachers were insensitive to the psychological problems of children.

In a recent investigation Sparks enlisted the co-operation of a sample of several hundred teachers in attacking the problem in a different way. The sample was divided into two randomly selected groups. Group I teachers were asked to rate the Wickman list of behavior problems as to their seriousness to the future adjustment of the child; Group II teachers, to do the same as to the child's troublesomeness in the classroom. Large differences were readily apparent in the ratings assigned the problems by the two groups. But the Group I teachers showed little tendency to rate the problems in the same way the psychologists and the mental hygienists had rated them. Rather the moralities came to the top—stealing, untruthfulness, and cheating. This investigation suggests that teachers are not sufficiently sensitive to the psychological problems of children, particularly those which present

problems to the child rather than to the teacher. The latter observation presupposes, of course, that the experts are right.⁷ Two interesting sidelights appeared. Sparks asked a group of about 60 graduate students of education to rate the problems as to seriousness to the future development of children. Their ratings agreed with those of Wickman's psychologists. As a second feature of his investigation Sparks grouped the teachers according to years of teaching experience and according to the amount of college training they had received. Neither of these factors seemed to make any difference in their ratings.

In addition to gaining a wide acquaintance with mental-hygiene literature, it is suggested that an ideal arrangement would be for teachers to league together to form study groups. In larger school systems these could be groups of first-grade teachers, second-grade teachers, and so on. The groups should be large enough to afford stimulation and yet not so large or so formal as to inhibit the members from saying what they really think. This will do little good unless it is backed by serious study of the literature.⁸ If a group leader or a resource person can be found, all the better. If not, the members of the group will have to exercise some self-discipline. One of the things Prescott and his colleagues discovered is that in the early stages of group work, teachers tend to report the meanings and the interpretations of pupils' behavior rather than a descriptive and factual account of what actually happened.⁹

The term "action research" may be applied to this type of co-operative activity. The activity should be teacher-initiated. Perhaps here emphasis should be given to the notion that the results will eventuate in action by the participants in the class-

⁷ J. N. Sparks, "Teachers' Attitudes toward the Behavior Problems of Children," *Journal of Educational Psychology*, 43 (1952), 284-91.

⁸ In addition to the books suggested in the preceding chapter, National Society for the Study of Education, *Mental Health in Modern Education*, just off the press, is recommended: Fifty-Fourth Yearbook, 1955, Part II.

⁹ American Council on Education, Commission on Teacher Education, *Helping Teachers Understand Children* (Washington, D.C.: American Council on Education, 1945)

room.¹⁰ While the suggestion made here implies that mental hygiene in teaching should be the central theme in study and group discussion, it need not be restricted to this purpose. It should be understood that our problem is the mental hygiene of *teaching*. As already suggested, the focus of our work should be upon teaching. Our objective is to help the pupil through teaching.¹¹

The Composite Teacher

In this section we are considering behavior that should characterize the men and women in the teaching profession. It is not supposed that all these traits will be exhibited by any one teacher. We would, however, like to think that all are well represented in the profession.

It is especially important that teachers be well adjusted. Perhaps the hazards to adjustment in teaching are no greater than they are in other professions. They may be of a different sort. In teaching we have to accommodate ourselves to a fairly strict routine. It is not easy to postpone to a more agreeable time many of the things we have to do. We frequently work in a tightly organized system. We cannot always do the things we wish to do or do them the way we think they should be done, or handle a particular pupil the way we wish to, because of supervisory or administrative intervention. Teachers often find some problem in maintaining satisfactory social contacts with other adults. For the purpose of furthering our understanding of the mental make-up of our students and of ourselves it is suggested that we read widely in the literature pertaining to adjustment, particularly the recent books on psychotherapy as listed in this and the preceding chapter.

¹⁰ Cf. S. M. Corey, *Action Research to Improve School Practices* (New York: Teachers College, Columbia University, 1953)

¹¹ Cantor's book just cited might be of some help in this connection. Cf. J. Dollard and N. E. Miller, *Personality and Psychotherapy* (New York: McGraw-Hill Book Co., 1950); D. B. Klein, *Mental Hygiene* (New York: Henry Holt and Co., 1944)

To the end that teachers may better accept themselves, it has been suggested that they dress smartly and attractively, cultivate the social graces, and take advantage of every opportunity to improve their cultural attainments and their education in general. These avenues offer the best chance of escaping the stereotyping that Judd had in mind. To the same end, such teachers will not spend too much of their time with their schoolwork. They will live eventfully. They will be wise in the ways of the world. They will have an acquaintance with great literature and with the great thoughts of mankind.

It goes without saying that the ideal teacher will know his subject and will be skilled in the art of teaching it. Perhaps this implies that he will also understand how the mind of the student develops—under the nurturing influence of education. This teacher will also be conscious of the history of our country and its institutions, understand their origins, and be sensitive to the meaning of democracy and its safeguards.

We would also like to think that knowledge and practice of good human relations in school is one of the outstanding characteristics of our profession. This means, first, a sensitivity to sources of conflict stemming from the differing racial, religious, and socioeconomic backgrounds of our pupils, and to the social-class inequities in education. Second, it means an understanding of the basic psychological needs of children. In practice it means providing ways for all children to achieve recognition, security, and response from others. Third, good human relationships in school call for a friendly, *warm, accepting*, but *impersonal* teacher, one who accepts a great deal and criticizes and disapproves sparingly and discerningly. Such a teacher is relaxed and not in too much of a hurry. This teacher understands that orderliness and constructive purpose in schoolwork is the essence of good discipline, and that there is no virtue in good order for order's sake. He is conscious of the importance of co-operativeness and group participation and of the cruciality of good morale. He appreciates the fact that the aims of growth and self-realization presuppose growth in self-control and the ability to assume responsibility for

one's own actions. Thus in a good school situation the teachers do not play dominative roles, although they are authority figures. Neither do the teachers adopt laissez-faire attitudes. They guide, direct, and otherwise play their roles as authority figures by enlisting the co-operation of their students. A good classroom is characterized by a minimum of teacher intervention and by as much self-control upon the part of the students as is commensurate with acceptable goals and learning procedures. The ideal teacher understands this. He also understands that dabbling and dawdling have no place in a good school. Finally the ideal teacher appreciates the fact that he may have a great deal to do with the way the pupil feels about himself, and that this may be tremendously important.¹²

What will be the consequences of our striving toward the ends just suggested? We will improve the status and prestige of teachers in the community generally as the number of teachers approaching this ideal composite increases. Parents, men and women in other professions, and our students will increasingly regard teachers as persons having the right to speak with authority about the education of American youth. Above all, what is important about this is the reflexive effect it has upon our own attitudes toward ourselves and our profession.

ADDITIONAL REFERENCES

- Alexander, A. M., "Teacher Judgment of Pupil Intelligence and Achievements Is Not Enough," *Elementary School Journal*, 53 (1953), 396-401
- Anderson, L. W., "Teacher Morale and Student Achievement," *Journal of Educational Research*, 46 (1953), 693-98
- Barr, A. S., et al., "Second Report of the Committee on Criteria of Teacher Effectiveness," *Journal of Educational Research*, 46 (1953), 641-58
- Berry, L. A., and Otto, H. J., "The Vocational Careers of Elementary-School Principals," *Elementary School Journal*, 54 (1954), 278-84

¹² Cf. W. Olson, *Child Development* (Boston: D. C. Heath and Co., 1949), Chap. VIII, "The Human Relations in the Classroom."

- Burke, N. G., and Anderson, K. E., "A Comparative Study of 1939 and 1950 Achievement Test Results in the Hawthorne Elementary School in Ottawa, Kansas," *Journal of Educational Research*, 47 (1953), 19-33
- Corey, S. M., "Action Research By Teachers and the Population Sampling Problem," *Journal of Educational Psychology*, 43 (1952), 331-38
- Driver, H. I., *Multiple Counseling; A Small-Group Discussion Method for Personal Growth* (Madison, Wis.: Monana Publications, 1954)
- Eglash, A., "A Group-Discussion Method of Teaching Psychology," *Journal of Educational Psychology*, 45 (1954), 257-67
- Escalona, S. K., *Understanding Hostility in Children* (Chicago: Science Research Associates, 1954)
- French, S. J., *Accent on Teaching* (New York: Harper and Brothers, 1954)
- Horn, T. D., "Social Relationships and the Elementary-School Curriculum," *Elementary School Journal*, 52 (1951), 36-41
- Jarecke, W. H., "Evaluating Teacher Success through the Use of the Teacher Judgment Test," *Journal of Educational Research*, 45 (1952), 683-94
- Kaplan, L., "The Annoyances of Elementary School Teachers," *Journal of Educational Research*, 45 (1952), 649-65
- Kinney, L., *Measure of a Good Teacher* (Sacramento: California Teachers Association, 1953)
- McCartha, C. W., "The Practice of Teacher Evaluation in the Southeast in 1948," *Journal of Educational Research*, 44 (1950), 122-28
- Mills, Q. B., and Rogers, D., "Personal and Professional Problems of Elementary School Teachers," *Journal of Educational Research*, 48 (1954), 279-88
- National Education Association, Research Division, *School Salary-Schedule Provisions, 121 Urban School Districts Over 100,000 in Population* (Washington, D.C.: National Education Association of the United States, 1954)
- Neatby, H., *So Little for the Mind* (Toronto: Clarke, Irwin and Co., 1953)
- North Carolina Department of Public Instruction, *Measurement of Teacher Merit* (Raleigh: State Superintendent of Public Instruction, 1952)

- Orleans, J. S., *et al.*, "Some Preliminary Thoughts on the Criteria of Teacher Effectiveness," *Journal of Educational Research*, 45 (1952), 641-48
- Robinson, F. P., *Principles and Procedures in Student Counseling* (New York: Harper and Brothers, 1950)
- Ryans, D. G., "Notes on the Ratings of Teacher Performance," *Journal of Educational Research*, 47 (1954), 695-703
- Schrupp, M. H., and Gjerde, C. M., "Teacher Growth in Attitudes toward Behavior Problems of Children," *Journal of Educational Psychology*, 44 (1953), 203-14
- Seidman, J. M., and Knapp, L. B., "Teacher Likes and Dislikes of Student Behavior and Student Perceptions of These Attitudes," *Journal of Educational Research*, 47 (1953), 143-49
- Shaw, J., "The Function of the Interview in Determining Fitness for Teacher-Training," *Journal of Educational Research*, 45 (1952), 667-81
- Symonds, P. M., "An Introduction to the Special Issue on Classroom Dynamics," *Journal of Educational Research*, 45 (1951), 81-87
- Thelen, H. A., *Dynamics of Groups at Work* (Chicago: University of Chicago Press, 1954)
- , "The Experimental Method in Classroom Leadership," *Elementary School Journal*, 53 (1952), 76-85
- , *et al.*, "Experimental Research toward a Theory Instruction," *Journal of Educational Research*, 45 (1951), 89-136
- U. S. Office of Education, *Bulletin*, No. 6, *Following Graduates into Teaching*, 1954

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